SQL (Basic)

Vanessa Casillas

Graduate Fellow

Before we start

- Download
  - MySQL
    - https://www.mysql.com/downloads/
  - DataGrip by JetBrains environment
    - https://www.jetbrains.com/datagrip/
    - Download and install on local machine (available for Windows and Mac)
- Survey
- https://github.com/CMC-QCL/SQL

Agenda

- SQL Overview
- Relational Databases
- Databases
- Basic SQL Statements
- SQL Database Query Difference
- DataGrip
- Basics SQL Commands Hands-on
- Operation Order
- Resources
- Contact Info

If you want to…

- See data
- Relationship between data
- Find any cell
- Add data to cells
- To add order to information

SQL Overview

Structured Query Language

Crud: create, read, update, delete

- Create databases and tables
- Look at specific data
- Make changes to data and remove data
- And more (level 2)

Relational Databases

A collection of tables

- Set of columns in each table and rows with data
- Each row is called a **record**
- Data between tables can be related between each other

Collection of tables is called **schema**

Relational DBMS

Courses_Students

ID	ClassID	Semester
71225	1005	Fall21
86634	1006	Spr22
32238	1009	Spr22

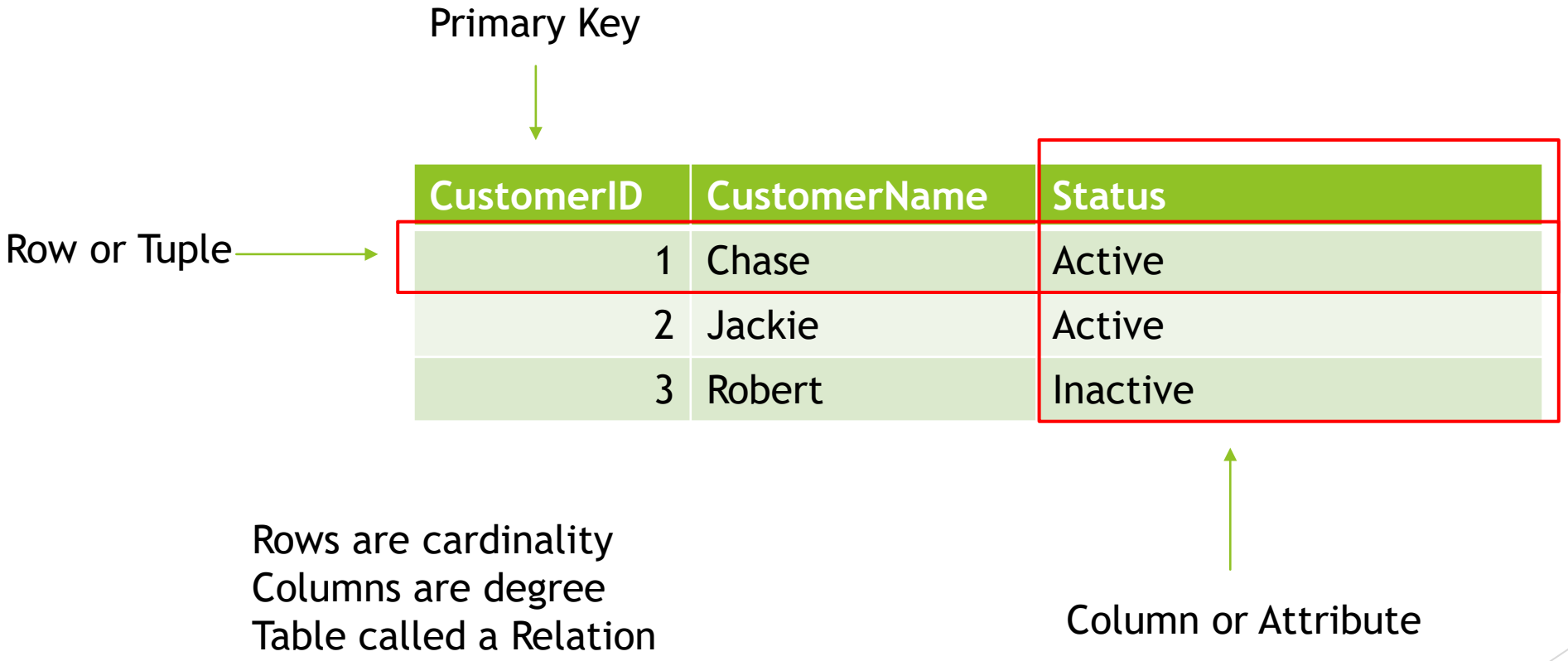
School_Courses

ClassID	Title	ClassNum
1005	Intro to Art History	500
1006	Intro to SQL	501
1009	Intro to Datebases	300

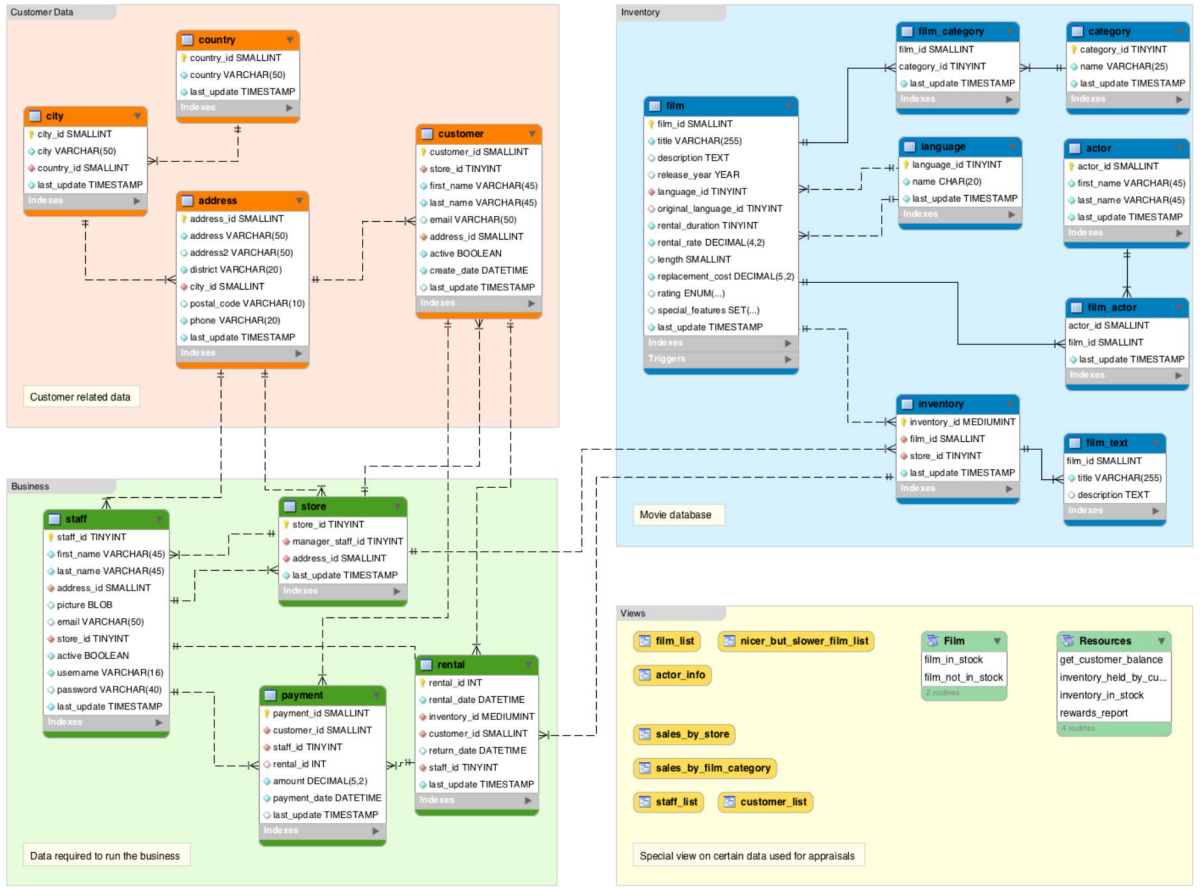
Students_Attendees

ID	Name	Grade	DOB
71225	Lili	Freshman	03/12/1995
32238	Brenda	Senior	05/28/1989
86634	James	Freshman	09/20/1998

The Relational Model



Schema Example



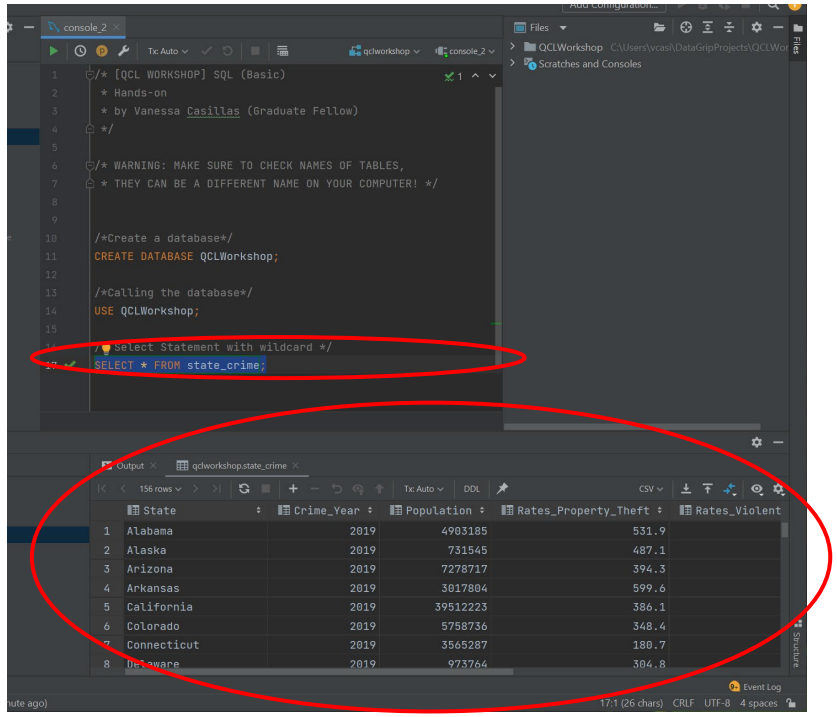
A database schema diagram of the Sakila Sample Database.

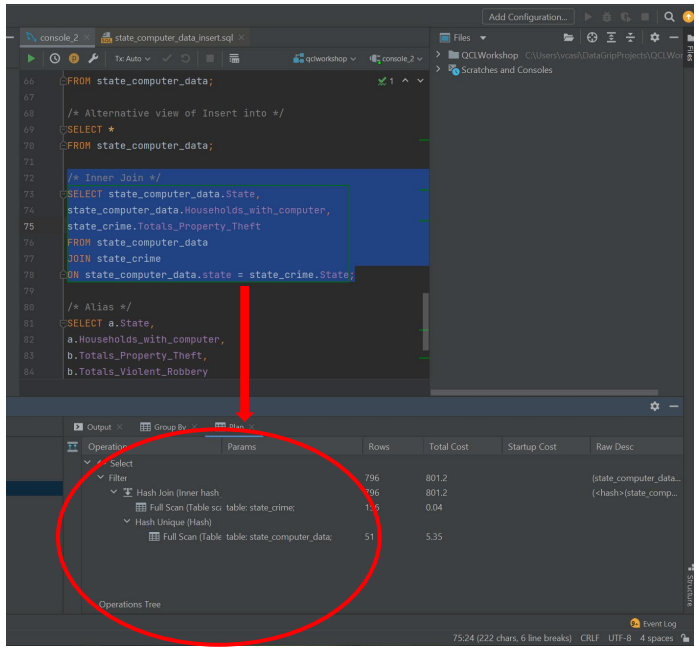
https://database.guide/what-is-a-database-schema/

Vocabulary

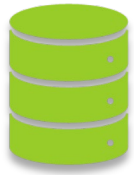
- Data Definition Language (DDL):
  - CREATE, DROP, ALTER, TRUNCATE
- Data Manipulation Language (DML):
  - INSERT, UPDATE, DELETE
- Data Query Language (DQL):
  - SELECT, JOIN
- Data Control Language (DCL):
  - GRANT, REVOKE

Basic SQL Statements



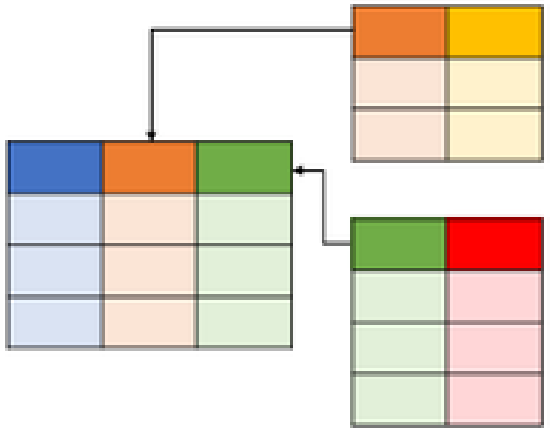


VIEW: virtual table



INDEX: users cannot see the index; it is used to retrieve data from the database more quickly

SQL DATABASES



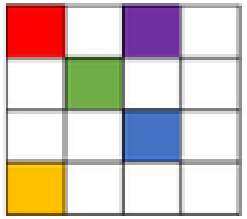
Relational

Relational Database management system

ACID compliant: (Atomicity, Consistency, Isolation, and Durability

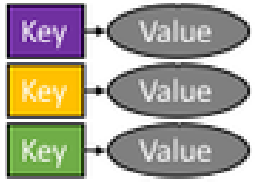
Vertically Scalable
Fixed or predefined Schema
Used for complex queries

NoSQL DATABASES

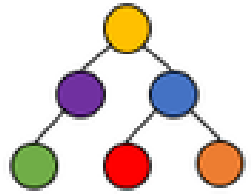


Column

Graph



Key-Value



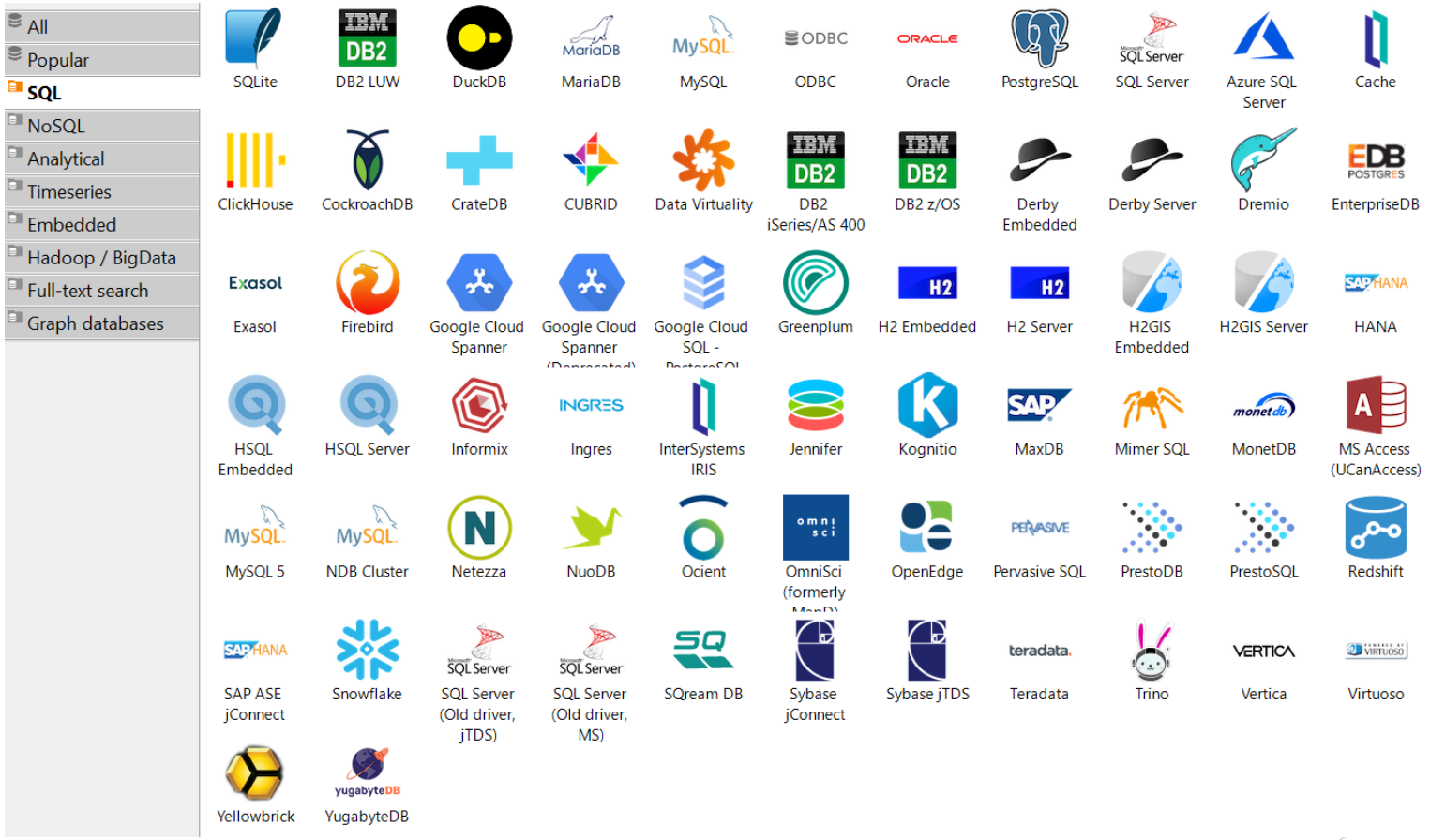
Document

Dynamic Scalable
Dynamic Schema
Not good for complex queries

Distributed Database Management system

CAP Theorem: Consistency, Availability, Partitioning

Relational SQL Databases



Interface

Text Editor Where you will write Queries

Choose your data base

Connect Database

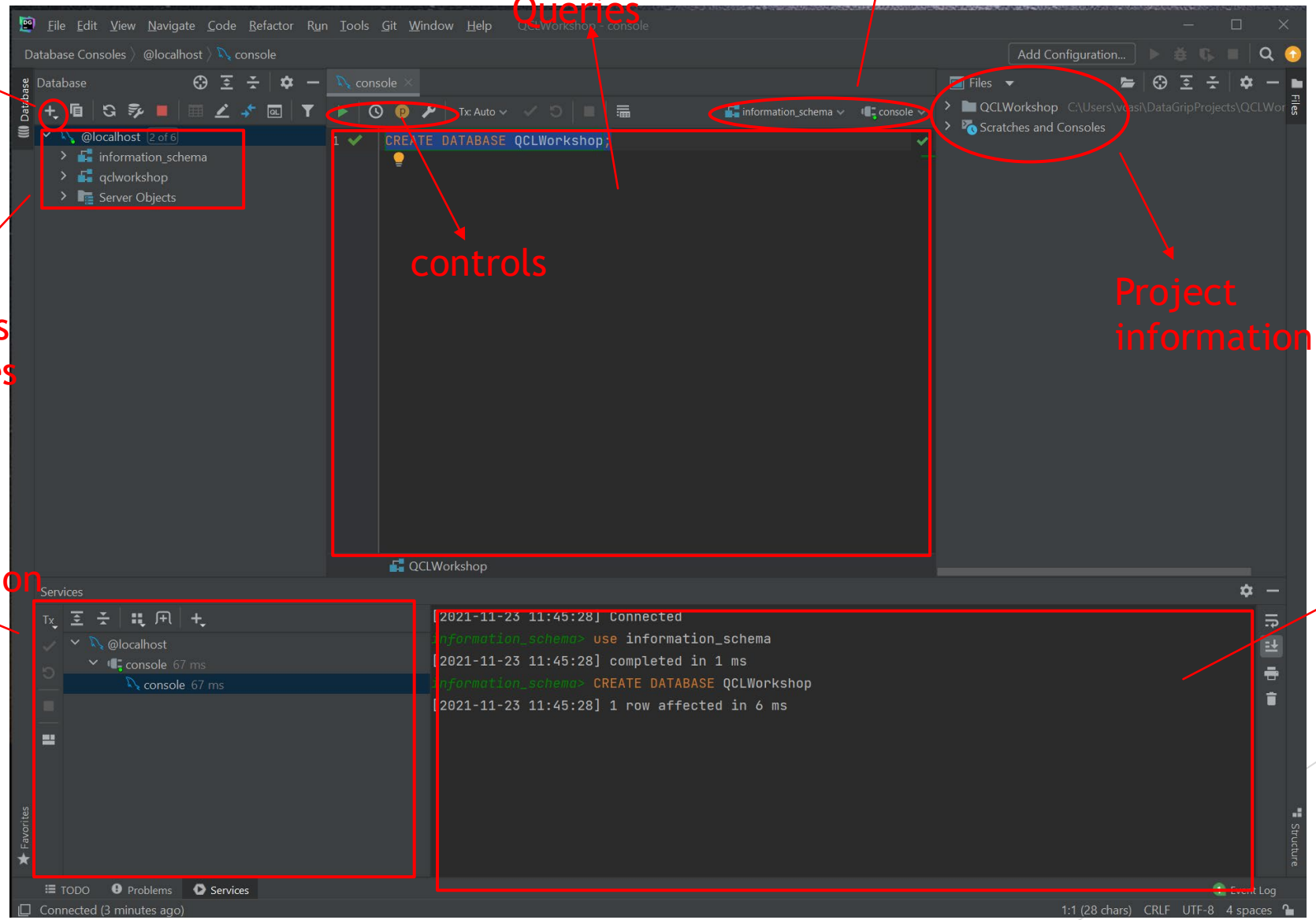
Databases and Tables

controls

Project information

Console Information

View, Results, Execution



Today's Goals

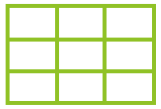
Whole - Big Picture

- Be able to take any data set and import into your database
- Be able to sort and look through your data set
- Be able to create your own data set and input data
- Be able to join data sets together

Parts – Small angles

- Use basic SQL commands
- Understand the process of writing a query
- Understand how data can be joined
- Understand the behind the scenes of how the query is operating

Today's Data



- Modified datasets for workshop (4 files total)
- **State Crime CSV File**
  - **state_crime.csv**
  - information on the crime rates and totals for states across the United States for a wide range of years
  - reports go from 1960 to 2019 (only used 2010, 2014 and 2019)
  - https://corgis-edu.github.io/corgis/csv/state_crime/
- **State Demographics CSV and SQL Files**
  - **state_computer_data.sql, state_workforce.csv, state_people.sql**
  - summarized information obtained about states in the United States from 2015 through 2019 through the United States Census Bureau
  - just the summarized data as of 2019
  - https://corgis-edu.github.io/corgis/csv/state_demographics/

https://corgis-edu.github.io/corgis/

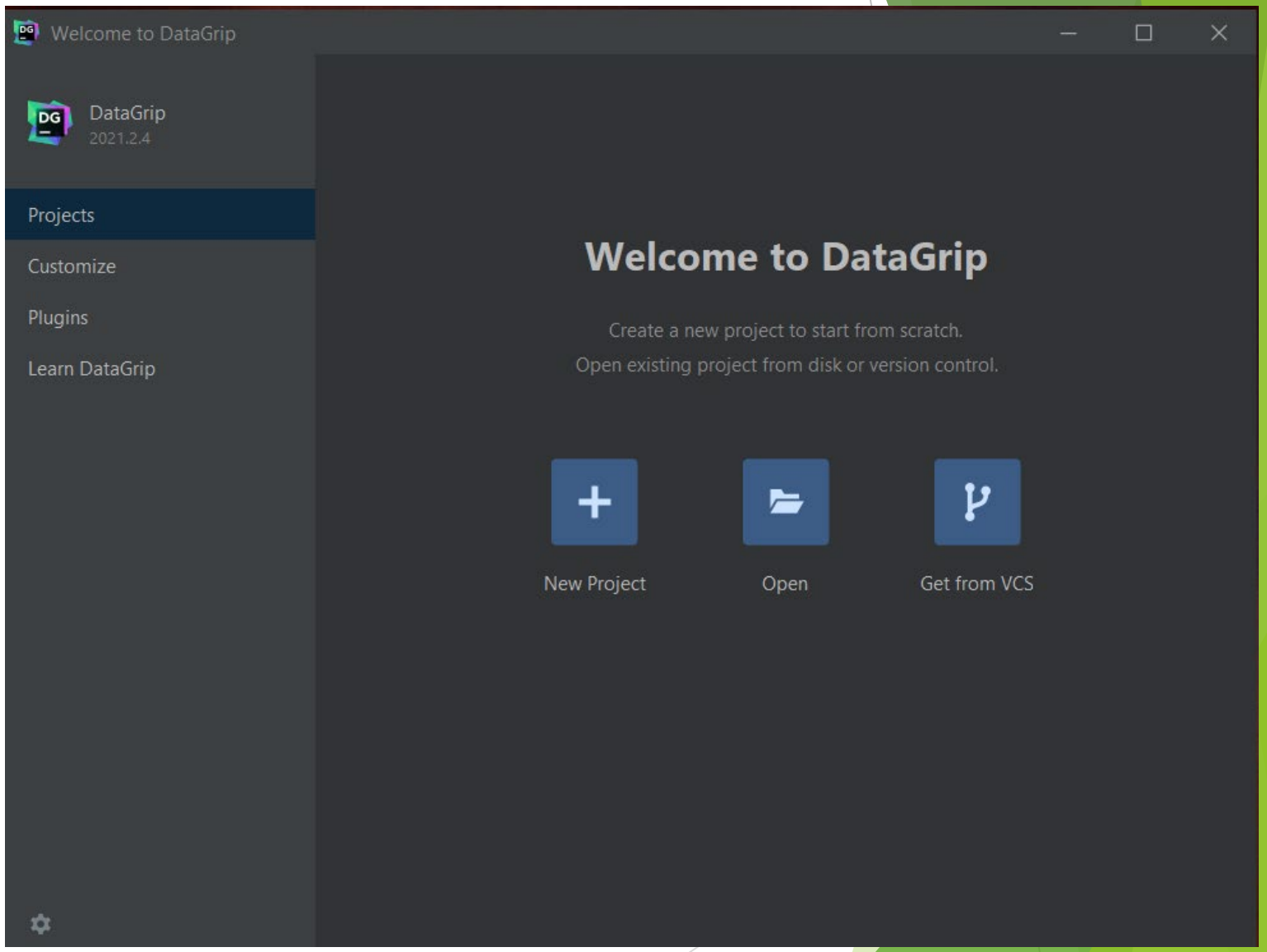
Basic SQL Commands Hands-on

Vanessa Casillas (Graduate Fellow at QCL)

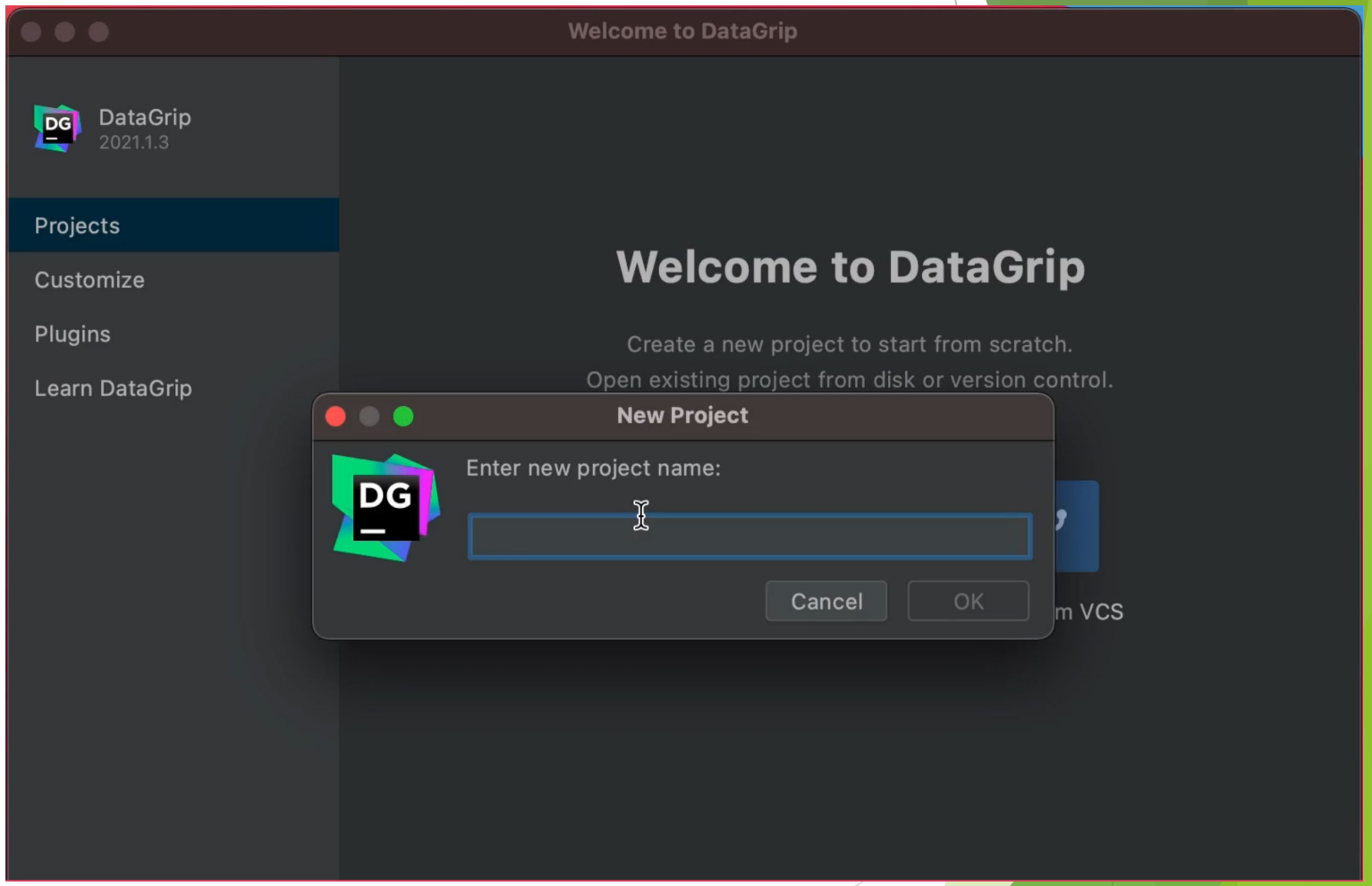
Hands-on Agenda

- Connect to Sever MySQL
- Start a Database called "QCLWorkshop"
- Import a data table called **state_crime**
- Query using the **SELECT** statement with ***
- Filter a query using the **WHERE** clause and **ORDER BY**
- Create data table called **state_computer_data**
- Insert **state_computer_data** from **sql file**
- Relate the two tables using the **JOIN** connector make **Alias**
- Use **Group by** to look sort the data set
- Throughout the workshop: Activities involving files named **state_workforce** and **state_people**

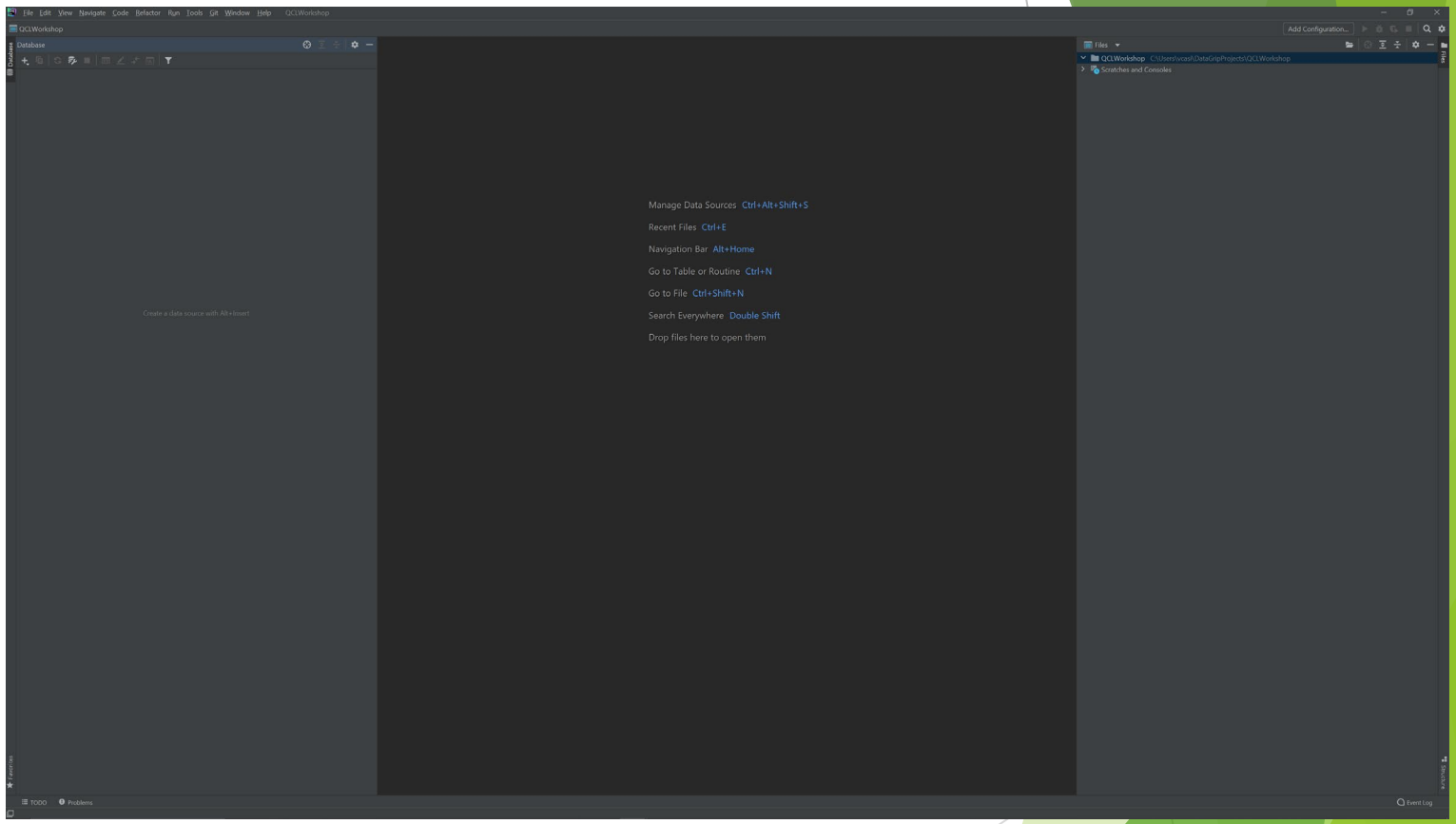
Click New Project



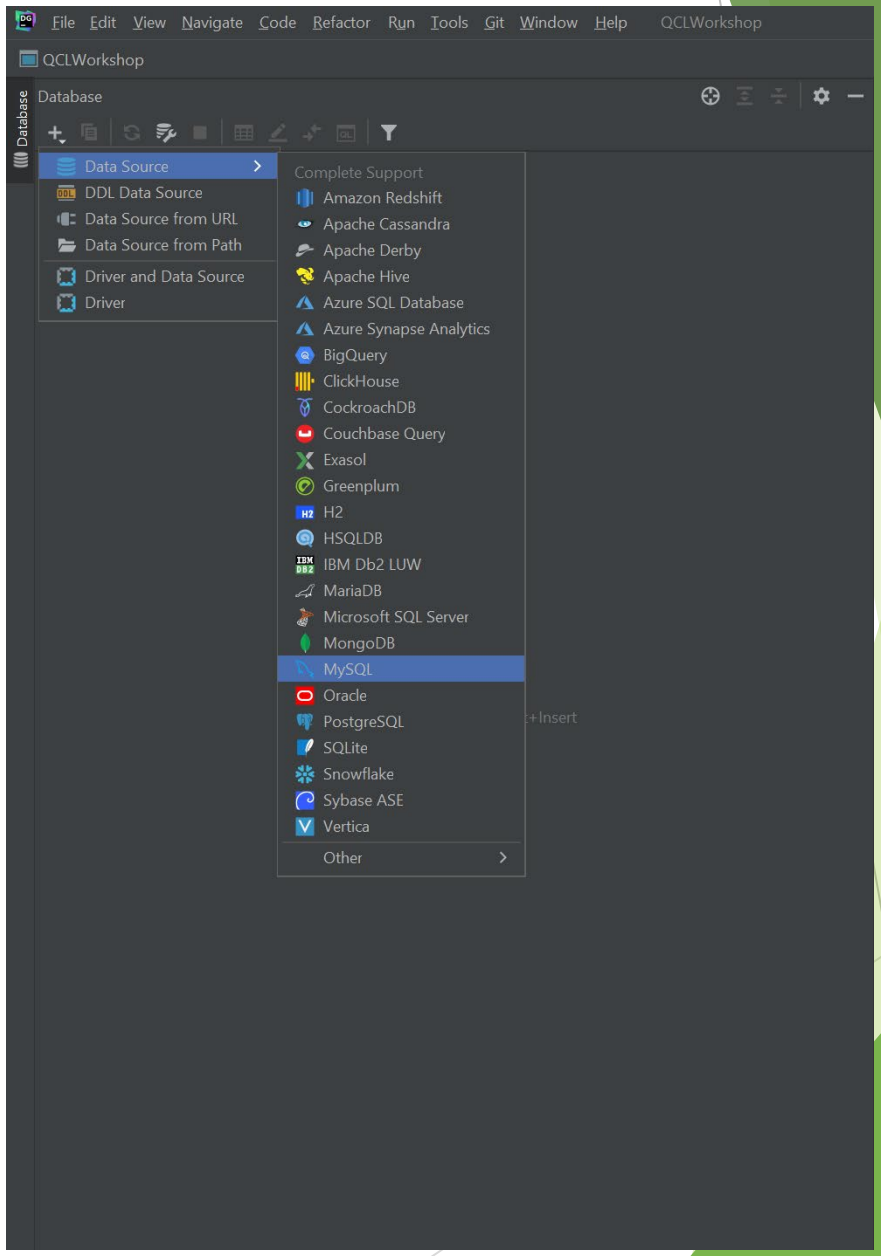
Make new project called “QCLWorkshop”



What is look like when you have it setup

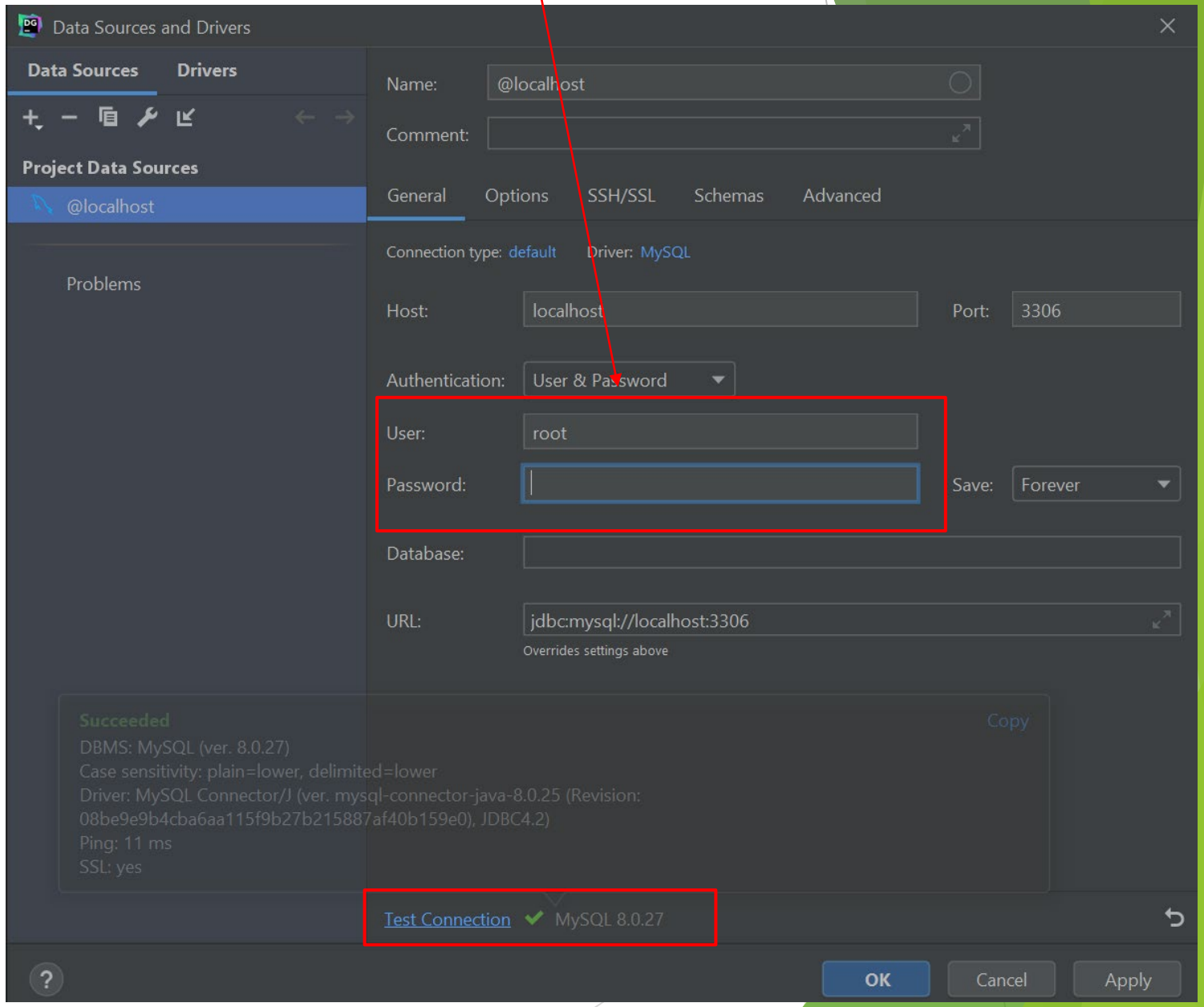


Click on the Plus Sign
Click on Data Source
Click on MySQL

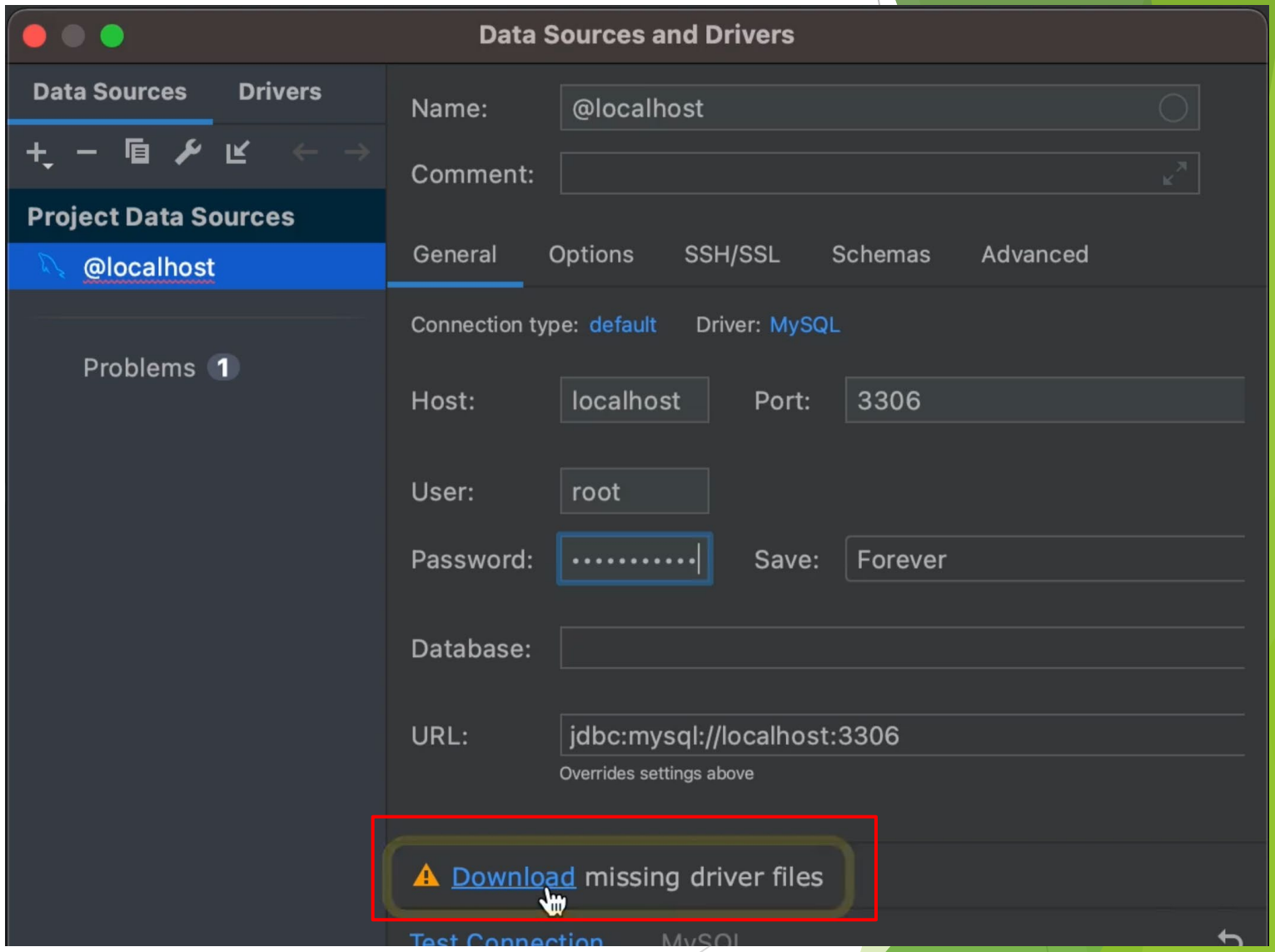


Password that you made or “1234pass”

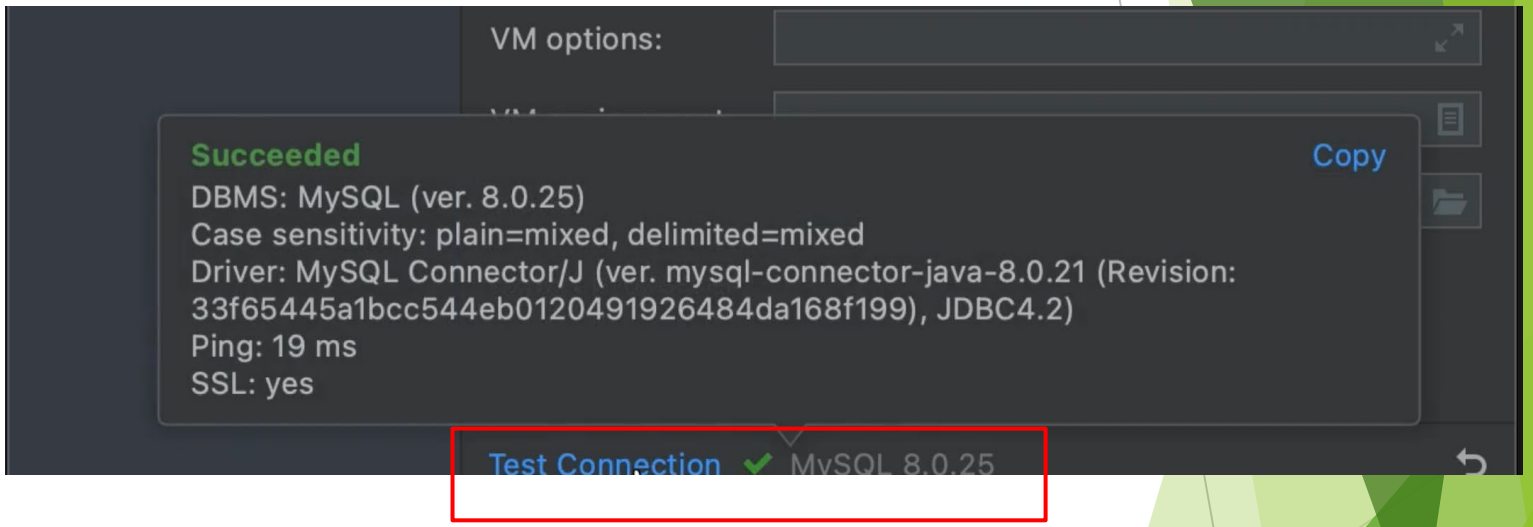
Fill in User: root
Fill in Password: 1234pass
Test Connection



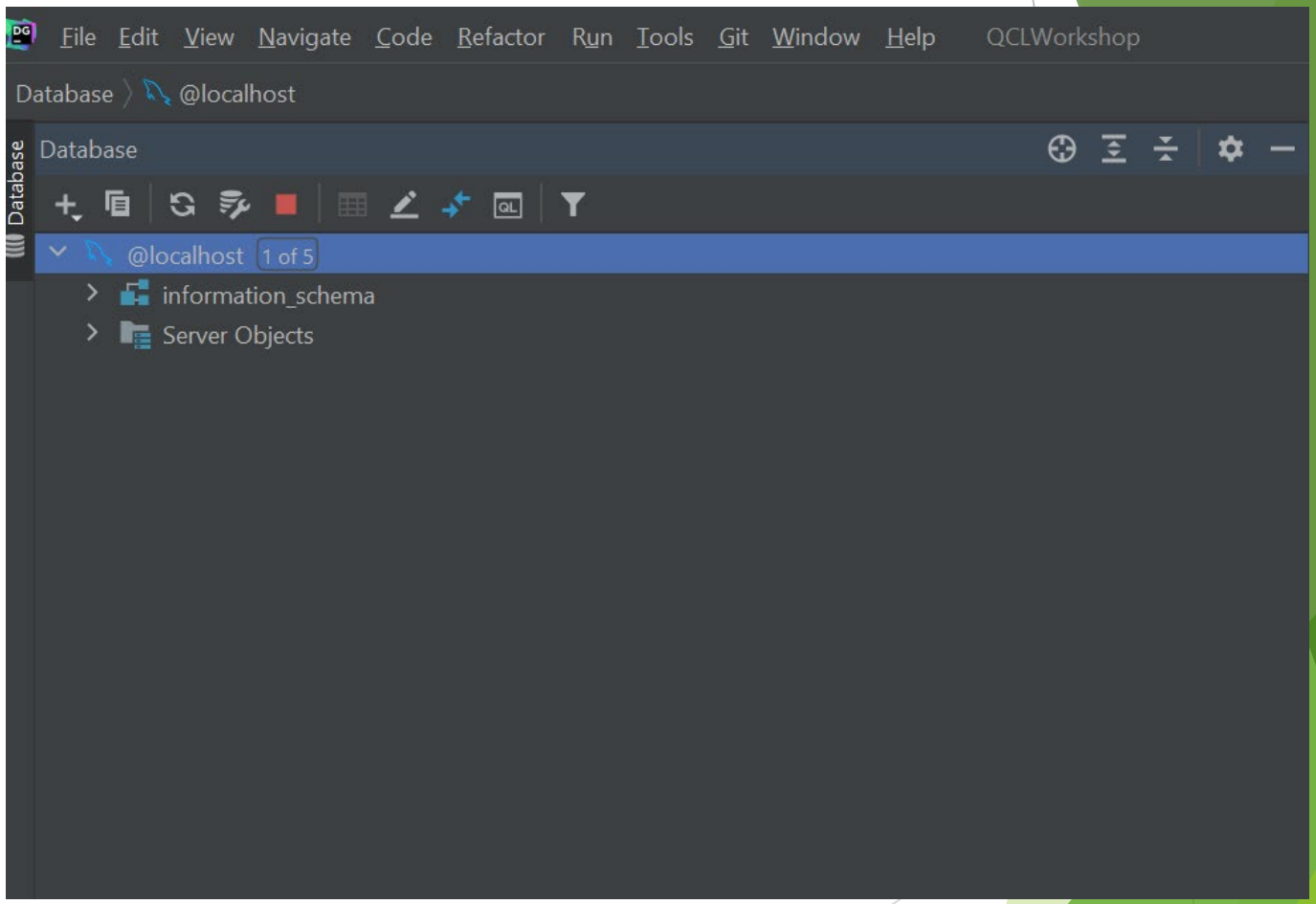
Download missing driver files



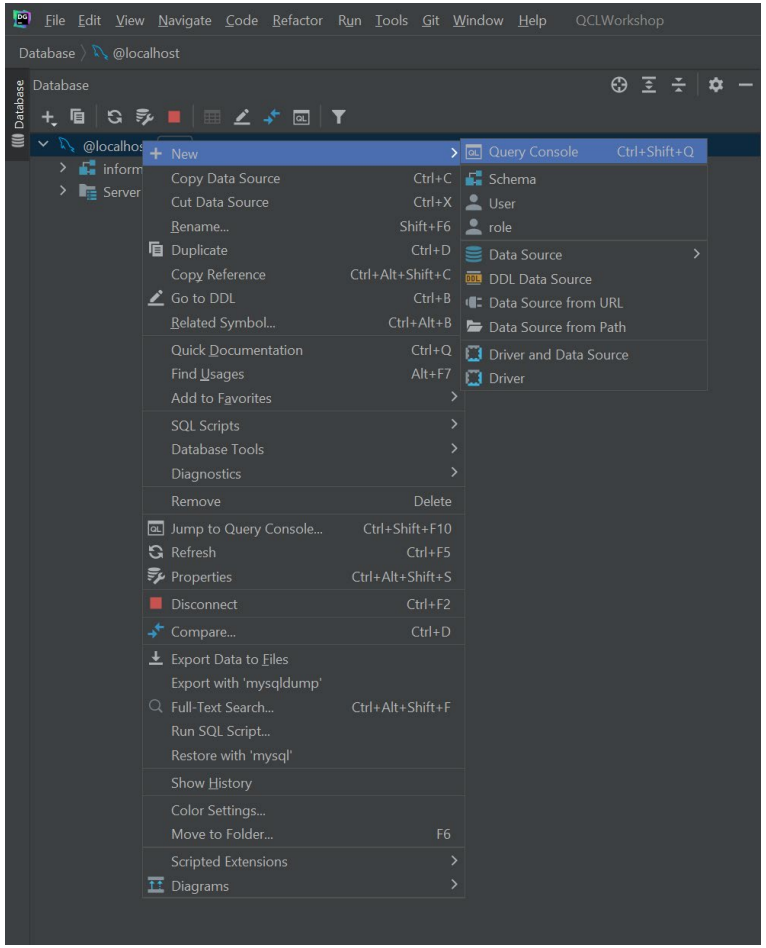
Test Connection

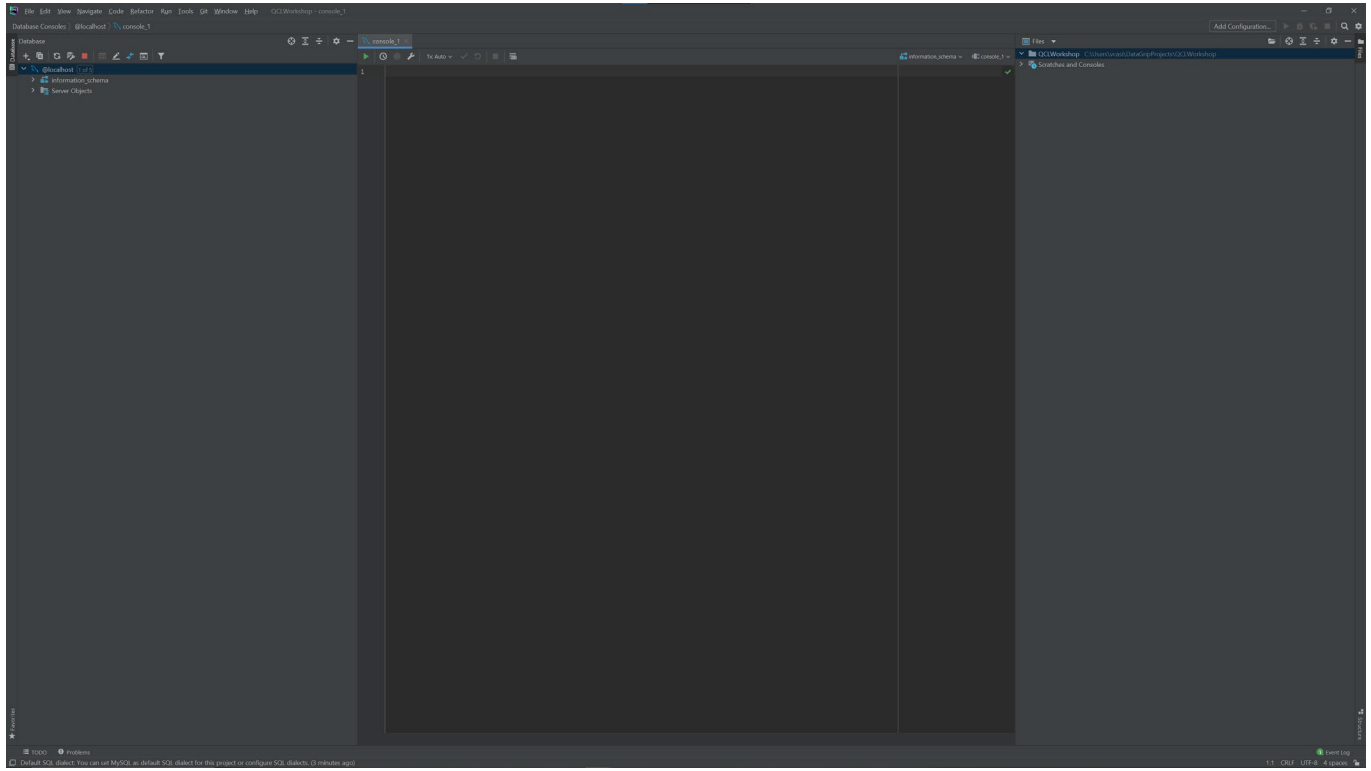


See the Sever on the left-hand side

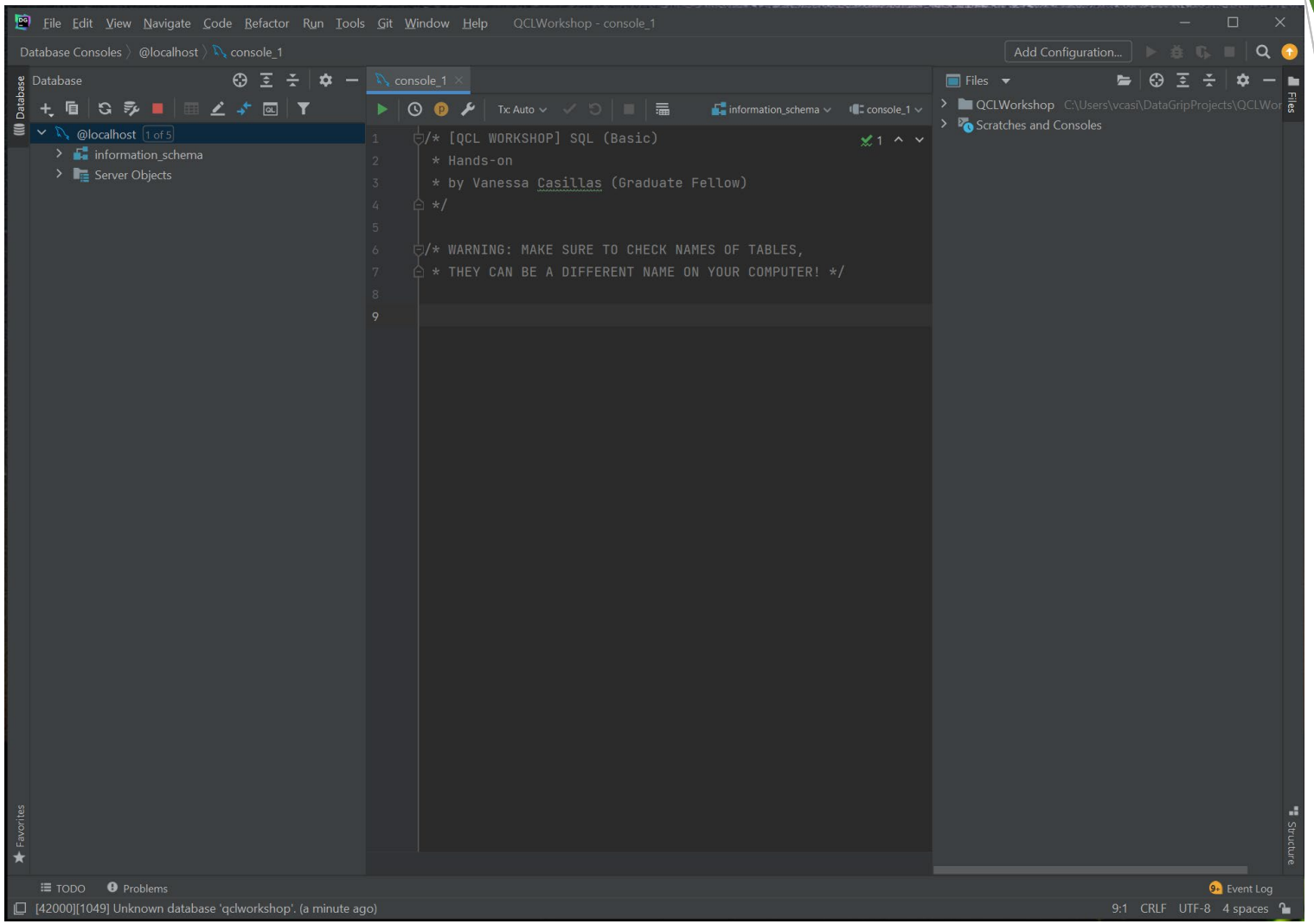


Right click, click new, click Query Console



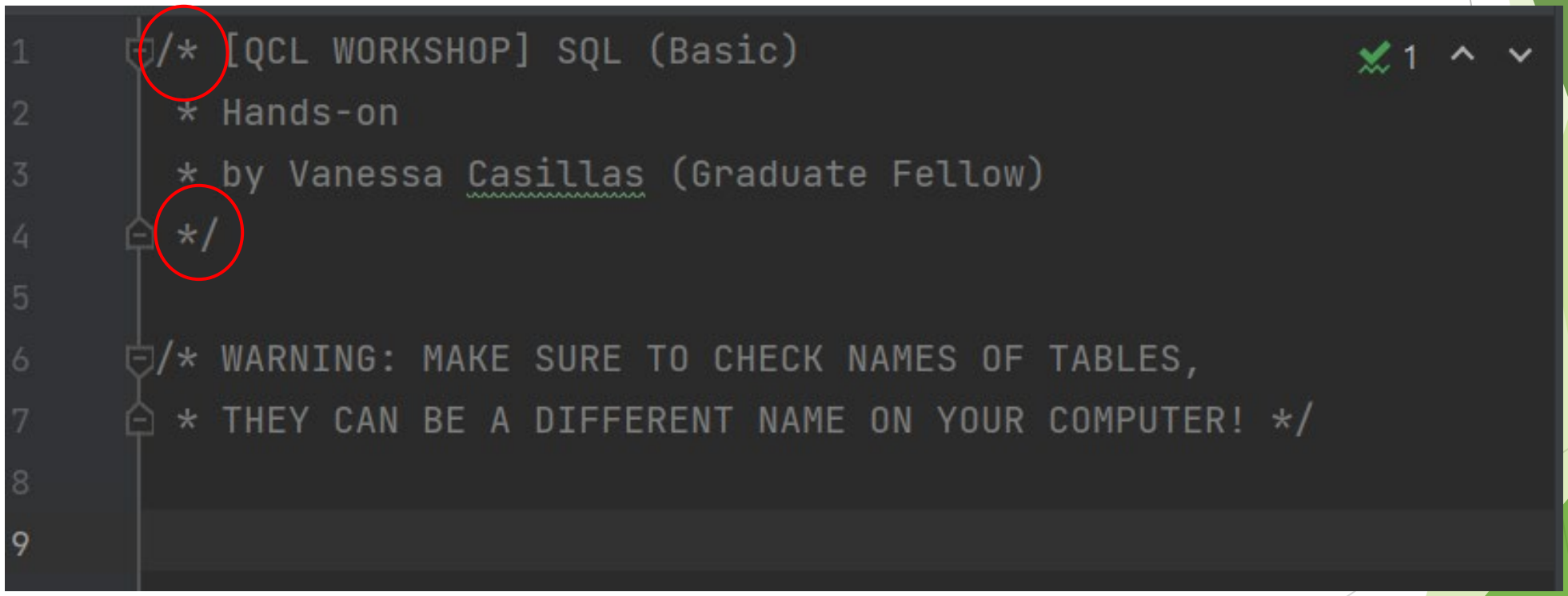


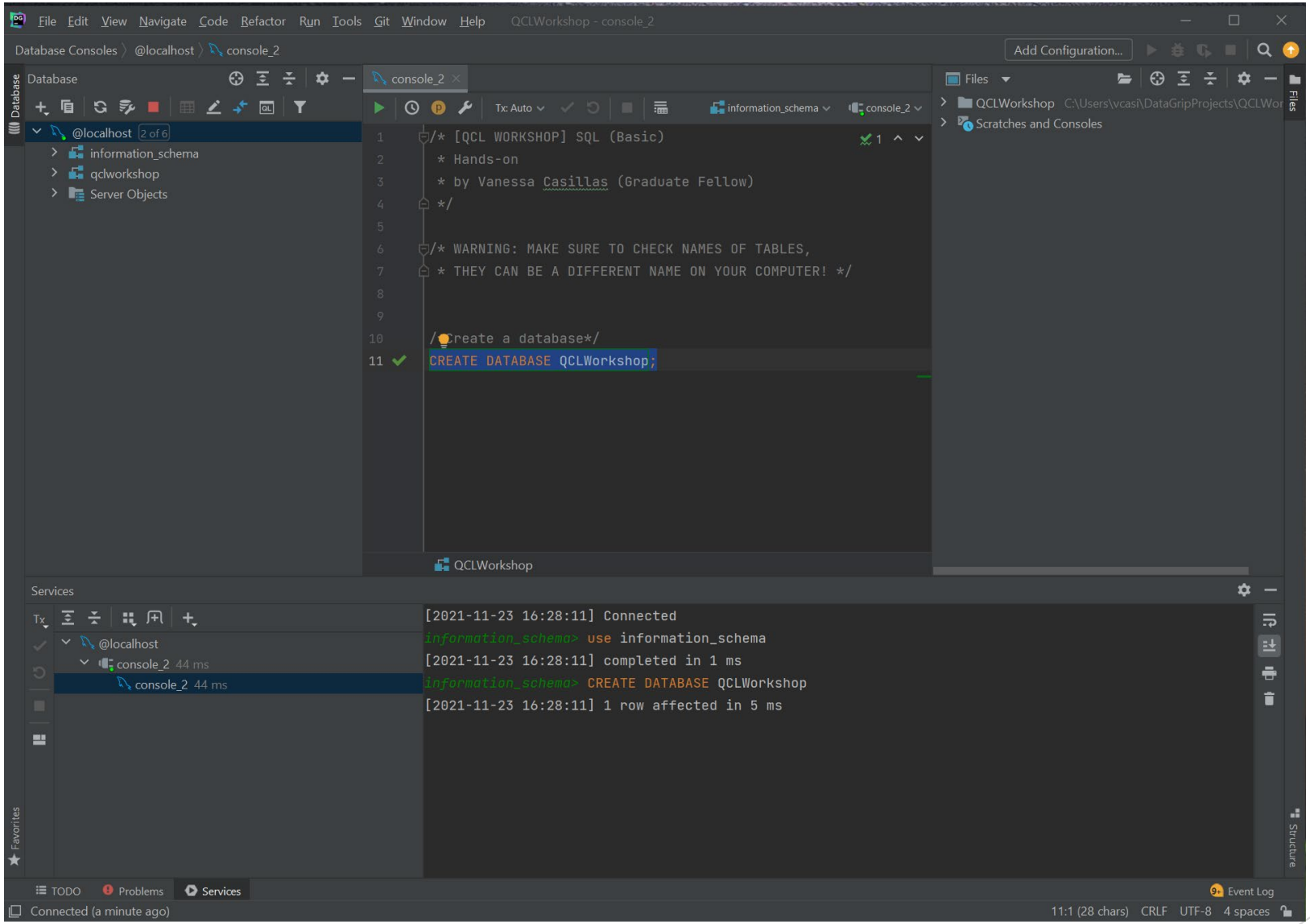
You are ready for the workshop



Note taking in SQL

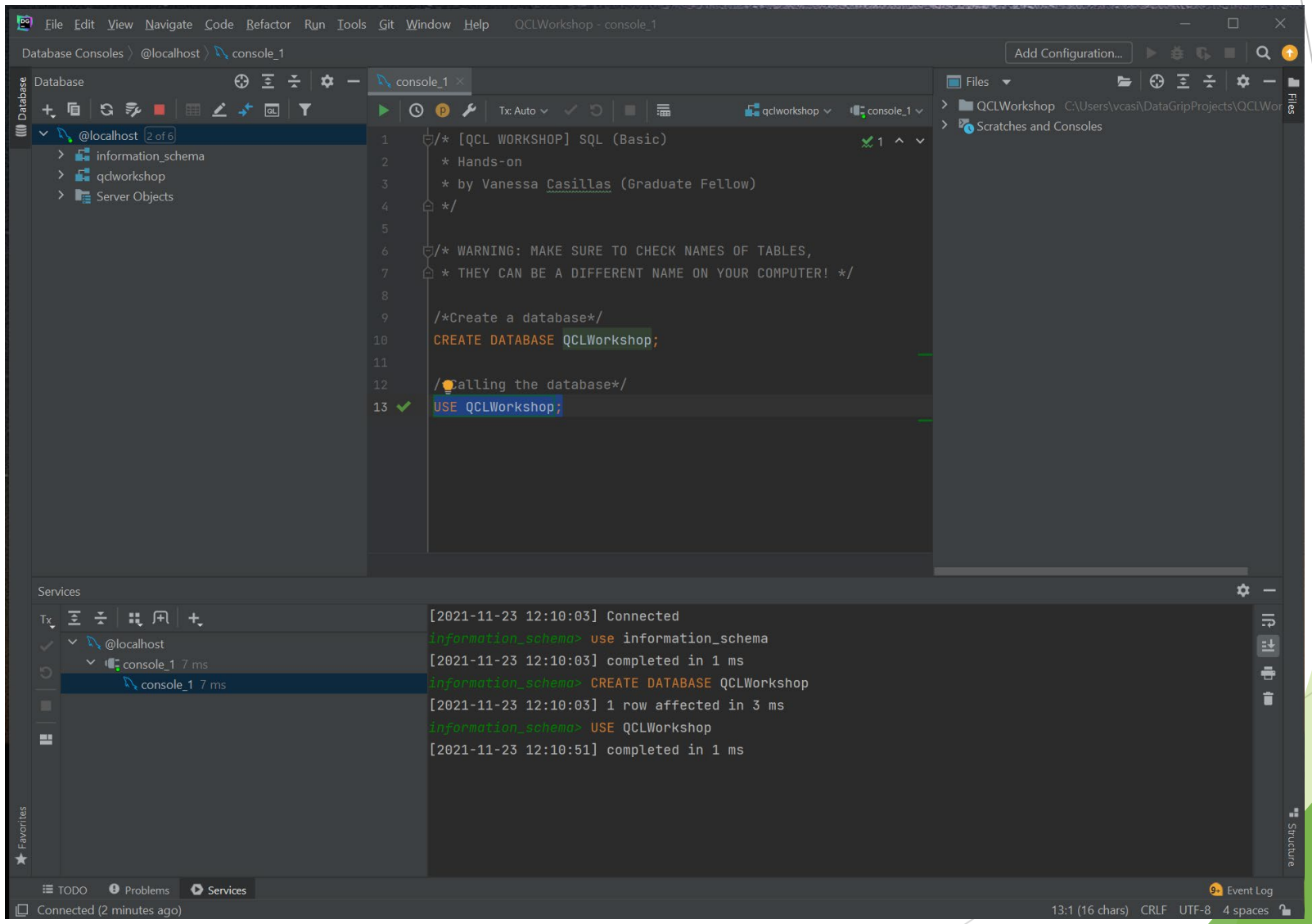
Notetaking

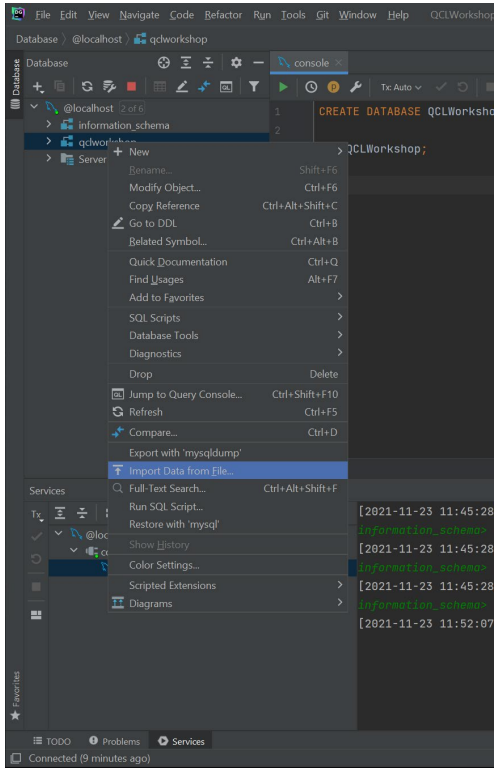

/* [QCL WORKSHOP] SQL (Basic)
* Hands-on
* by Vanessa Casillas (Graduate Fellow)
*/
/* WARNING: MAKE SURE TO CHECK NAMES OF TABLES,
* THEY CAN BE A DIFFERENT NAME ON YOUR COMPUTER! */

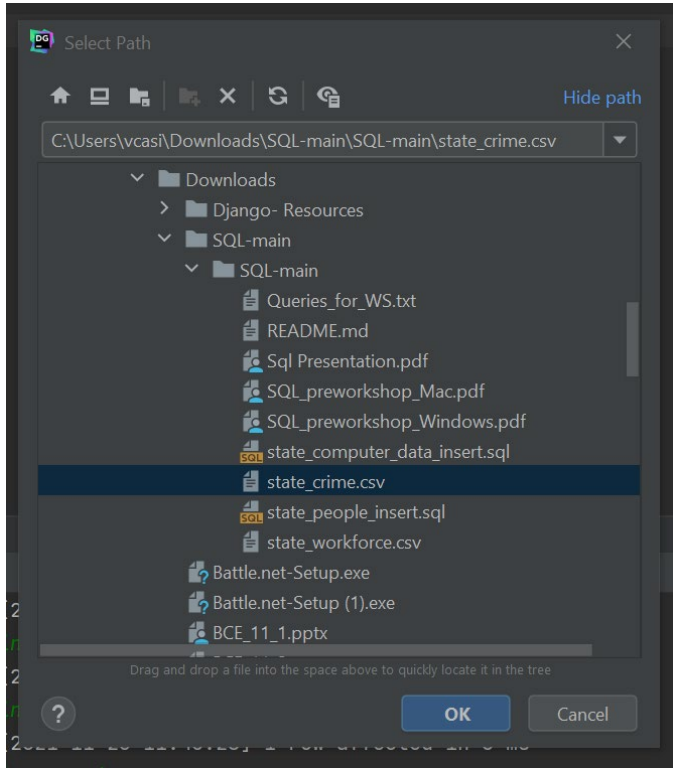


Creating a Database

Calling the Database

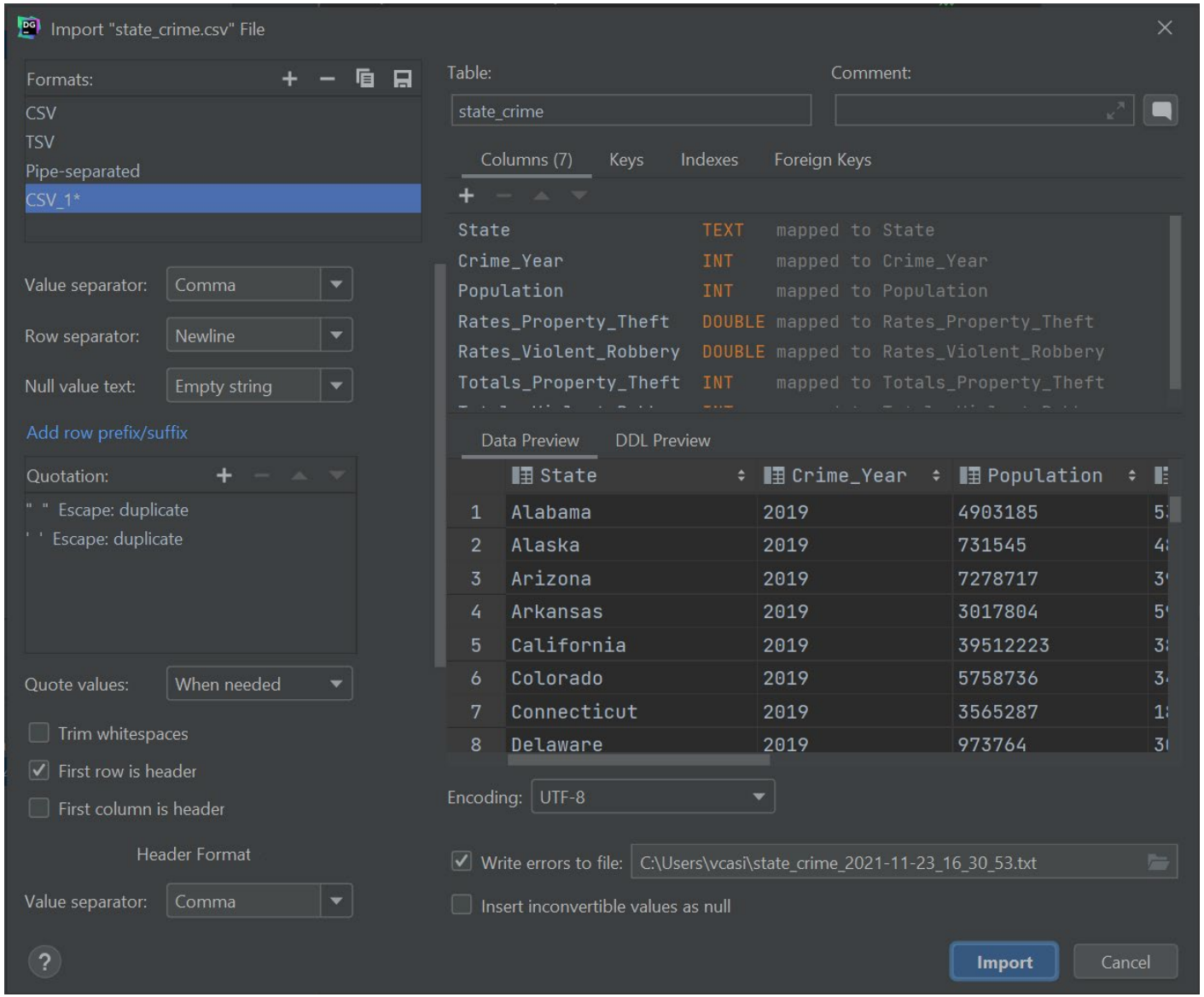






Import CSV

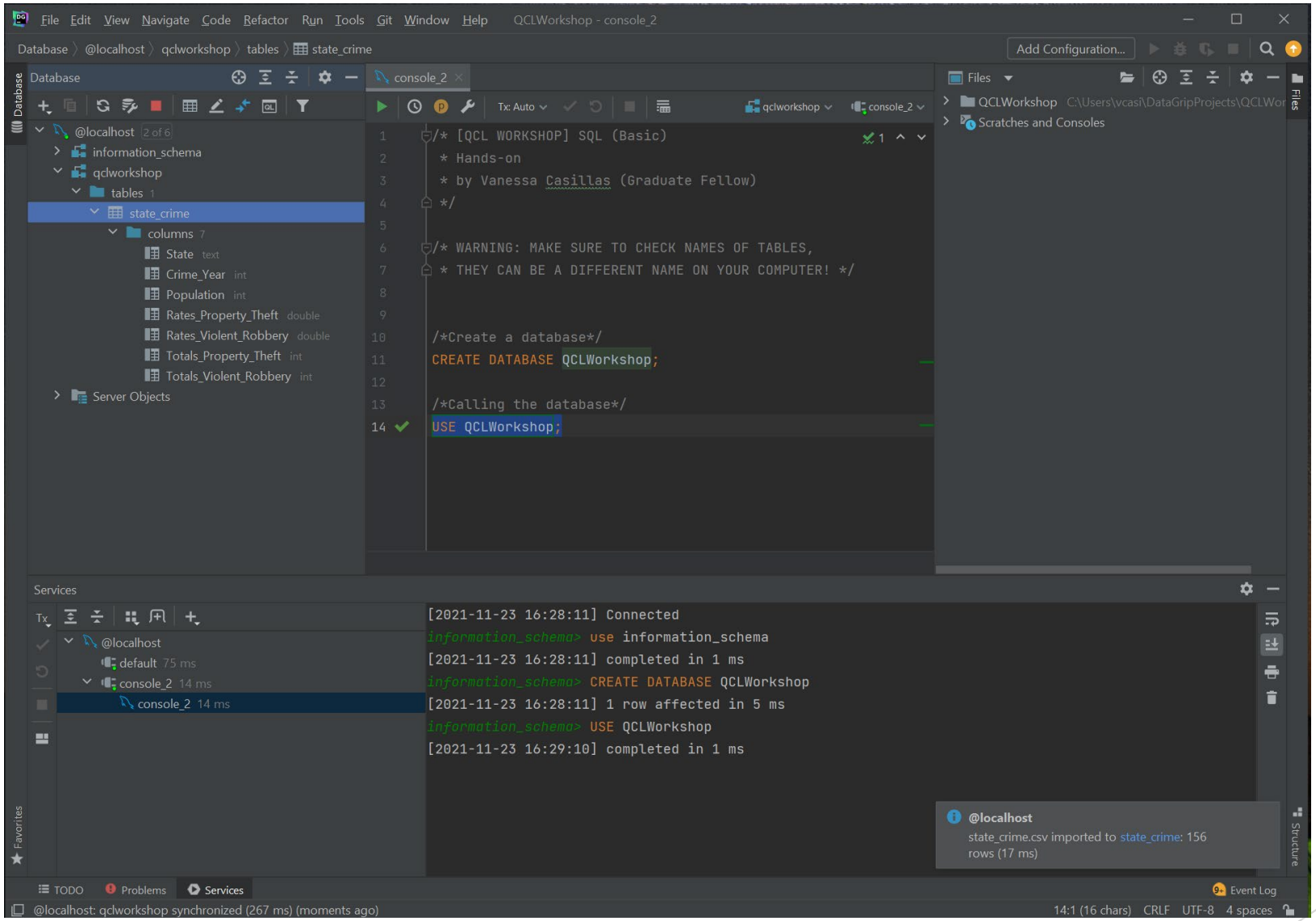
Vanessa Casillas (Graduate Fellow at QCL)



Import CSV (cont.)

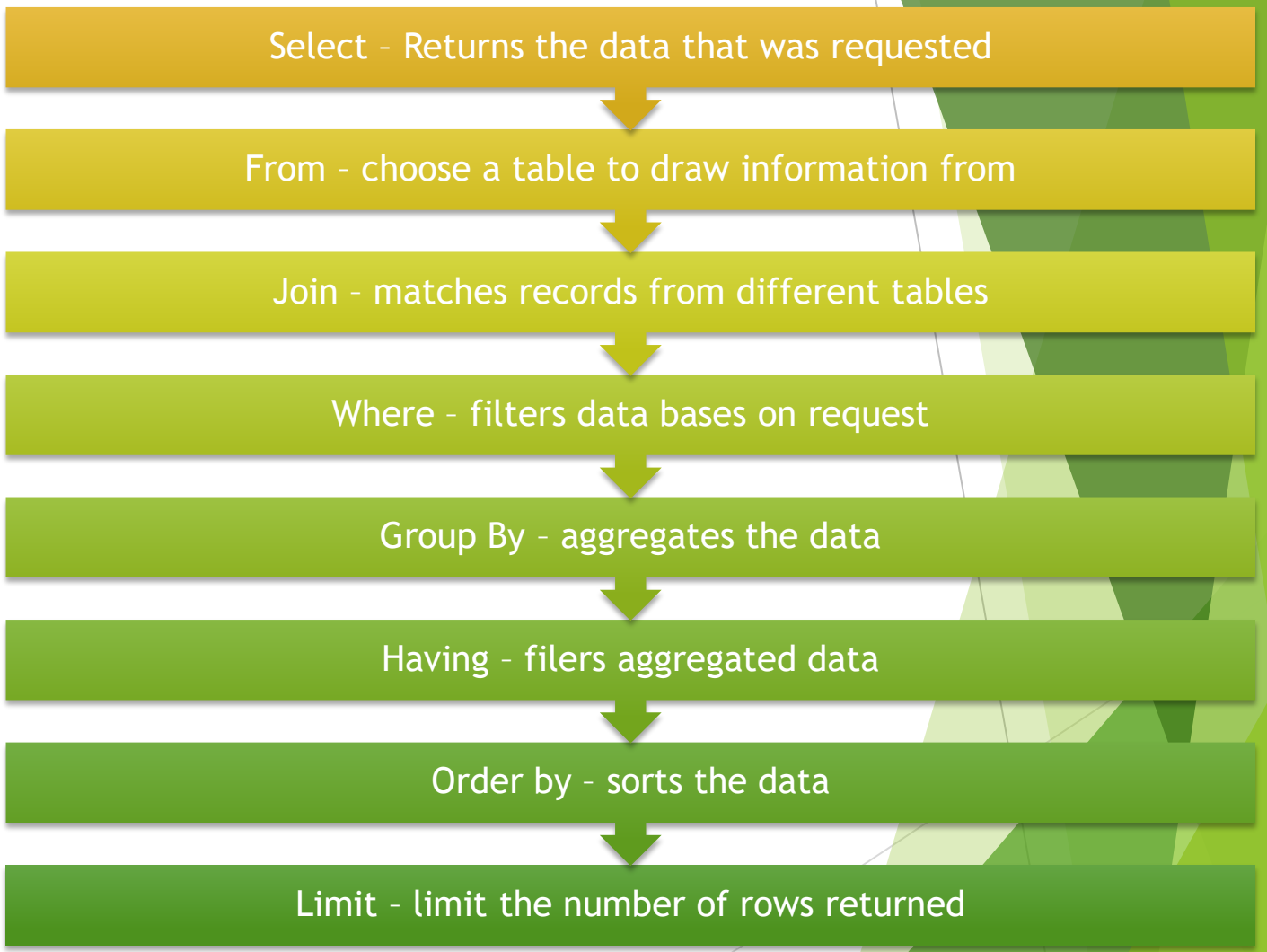
Data types

- Text vs. Varchar
- Int vs. Integer
- Double vs. Real vs. Float



Successful Import of CSV

Writing Query

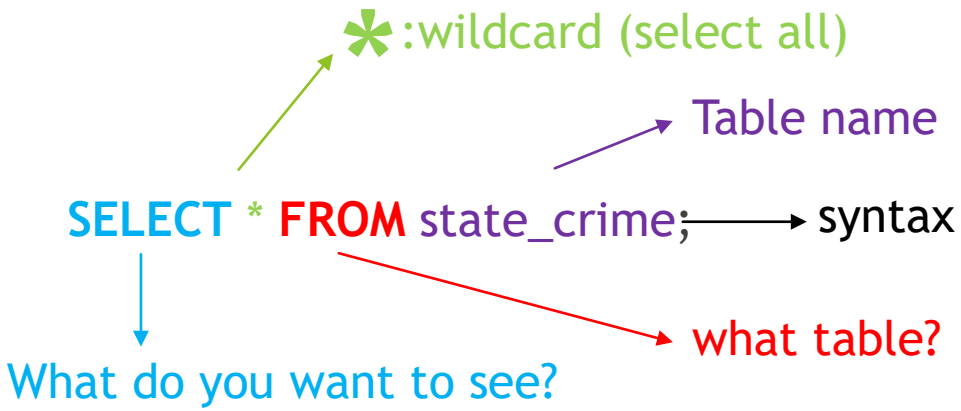


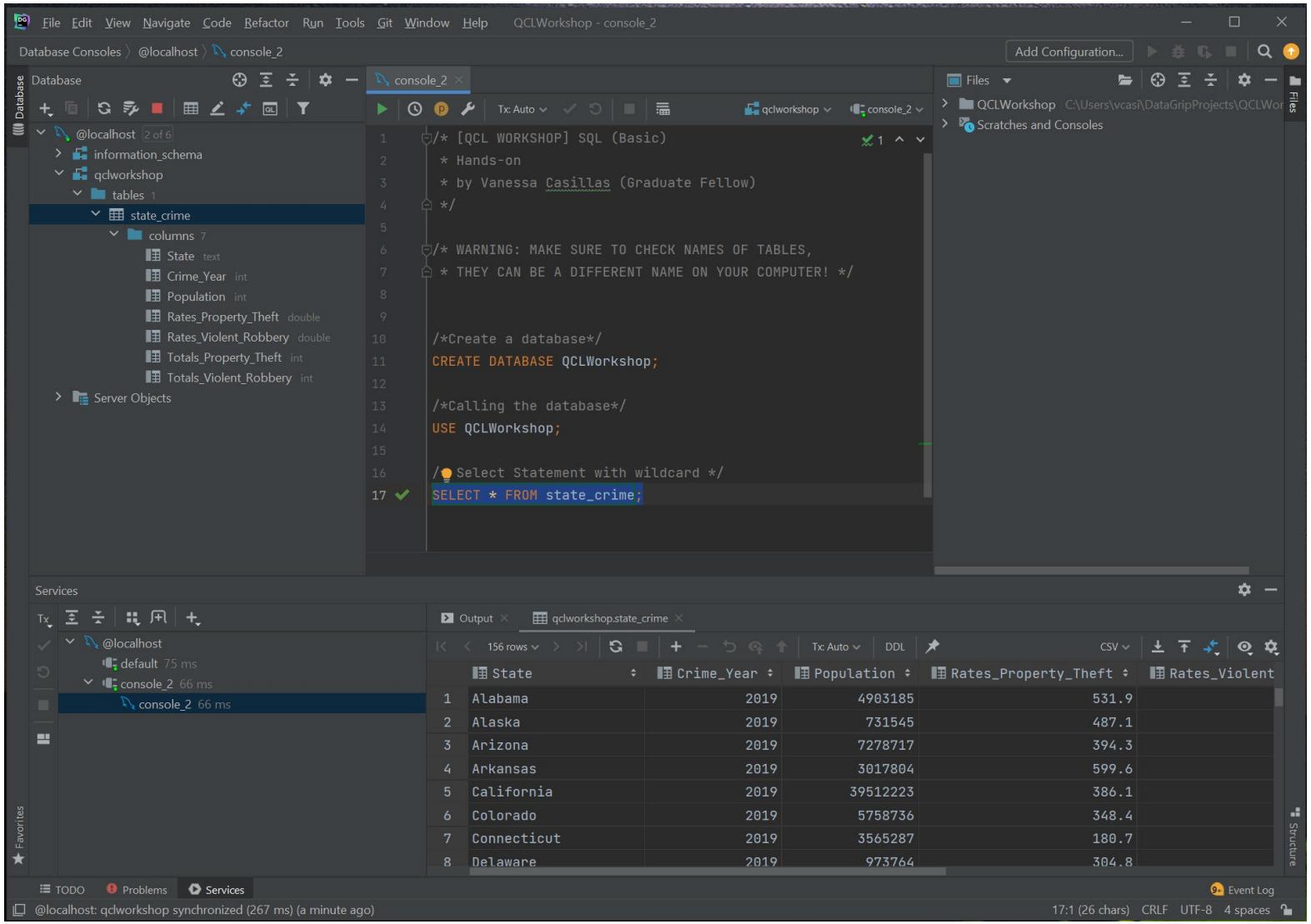
Select with *

```
/* Select Statement with wildcard */
SELECT * FROM state_crime;
```

Detailed view

```
SELECT column1, column2, ...
FROM table_name;
```




File Edit View Navigate Code Refactor Run Tools Git Window Help
QCLWorkshop - console_2
Database Consoles @localhost console_2
Add Configuration...
Database
@localhost 2 of 6
information_schema
qclworkshop
tables 1
state_crime
columns 7
State text
Crime_Year int
Population int
Rates_Property_Theft double
Rates_Violent_Robbery double
Totals_Property_Theft int
Totals_Violent_Robbery int
Server Objects
console_2
Tx: Auto
qclworkshop
console_2
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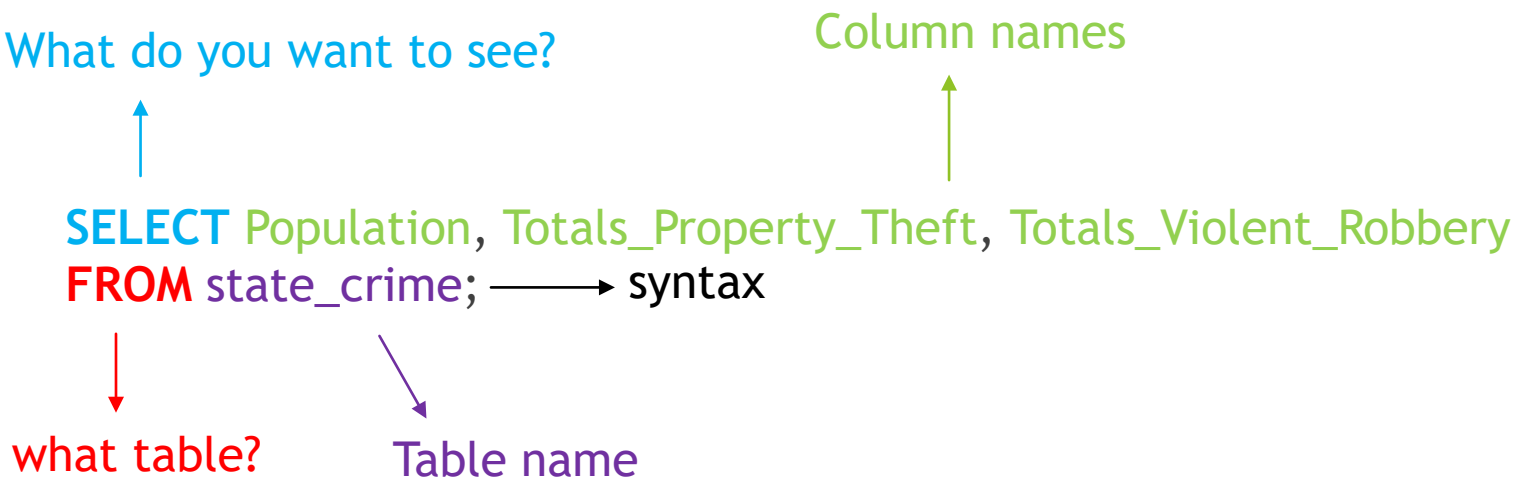
/*Create a database*/
CREATE DATABASE QCLWorkshop;
/*Calling the database*/
USE QCLWorkshop;
/* Select Statement with wildcard */
SELECT * FROM state_crime;
Files
QCLWorkshop C:\Users\vcasi\DataGripProjects\QCLWor
Scratches and Consoles
Services
@localhost
default 75 ms
console_2 66 ms
console_2 66 ms
Output
qclworkshop.state_crime
156 rows
Tx: Auto
DDL
CSV
State Crime_Year Population Rates_Property_Theft Rates_Violent
1 Alabama 2019 4903185 531.9
2 Alaska 2019 731545 487.1
3 Arizona 2019 7278717 394.3
4 Arkansas 2019 3017804 599.6
5 California 2019 39512223 386.1
6 Colorado 2019 5758736 348.4
7 Connecticut 2019 3565287 180.7
8 Delaware 2019 973764 304.8
TODO
Problems
Services
Event Log
@localhost: qclworkshop synchronized (267 ms) (a minute ago)
17:1 (26 chars) CRLF UTF-8 4 spaces

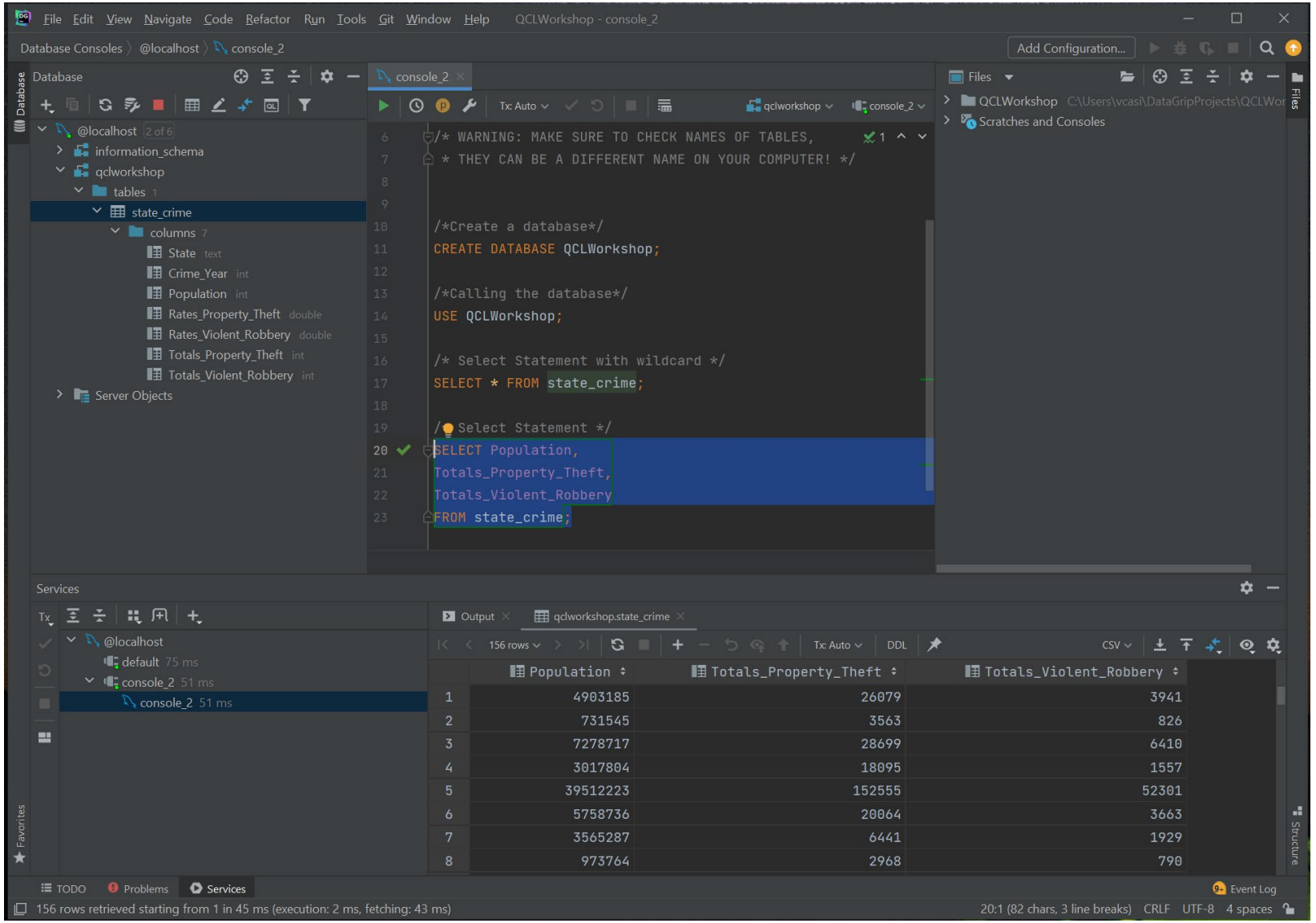
Select with columns

```
/* Select Statement */
SELECT Population,
Totals_Property_Theft,
Totals_Violent_Robbery
FROM state_crime;
```

Detailed view

```
SELECT column1, column2, ...
FROM table_name;
```




File Edit View Navigate Code Refactor Run Tools Git Window Help
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Database Consoles @localhost console_2
Add Configuration...
Database
@localhost 2 of 6
information_schema
qclworkshop
tables 1
state_crime
columns 7
State text
Crime_Year int
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Rates_Property_Theft double
Rates_Violent_Robbery double
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Tx: Auto
qclworkshop
console_2
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QCLWorkshop C:\Users\vcasi\DataGripProjects\QCLWor
Scratches and Consoles
Services
@localhost
default 75 ms
console_2 51 ms
console_2 51 ms
Output
qclworkshop.state_crime
156 rows
Tx: Auto
DDL
CSV
Population
Totals_Property_Theft
Totals_Violent_Robbery
1 4903185 26079 3941
2 731545 3563 826
3 7278717 28699 6410
4 3017804 18095 1557
5 39512223 152555 52301
6 5758736 20064 3663
7 3565287 6441 1929
8 973764 2968 790
TODO
Problems
Services
Event Log
156 rows retrieved starting from 1 in 45 ms (execution: 2 ms, fetching: 43 ms)
20:1 (82 chars, 3 line breaks) CRLF UTF-8 4 spaces

Activity #1 – Select

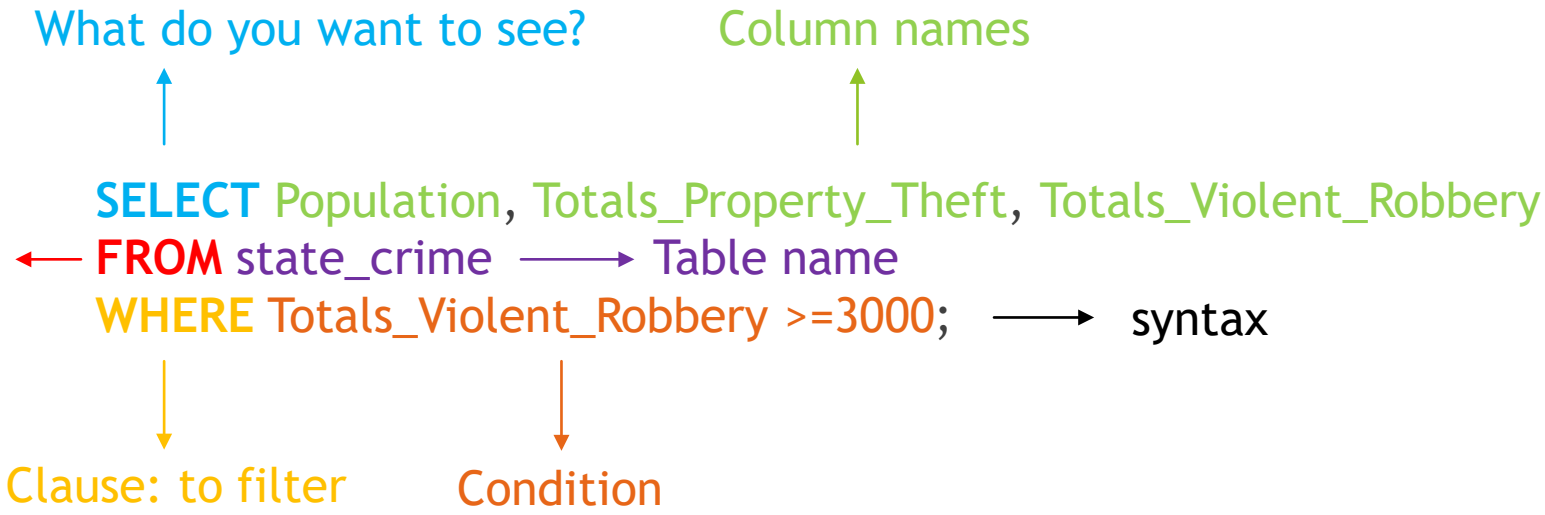
- Import the file named state_workforce
  1. How many rows and attributes does this table have?

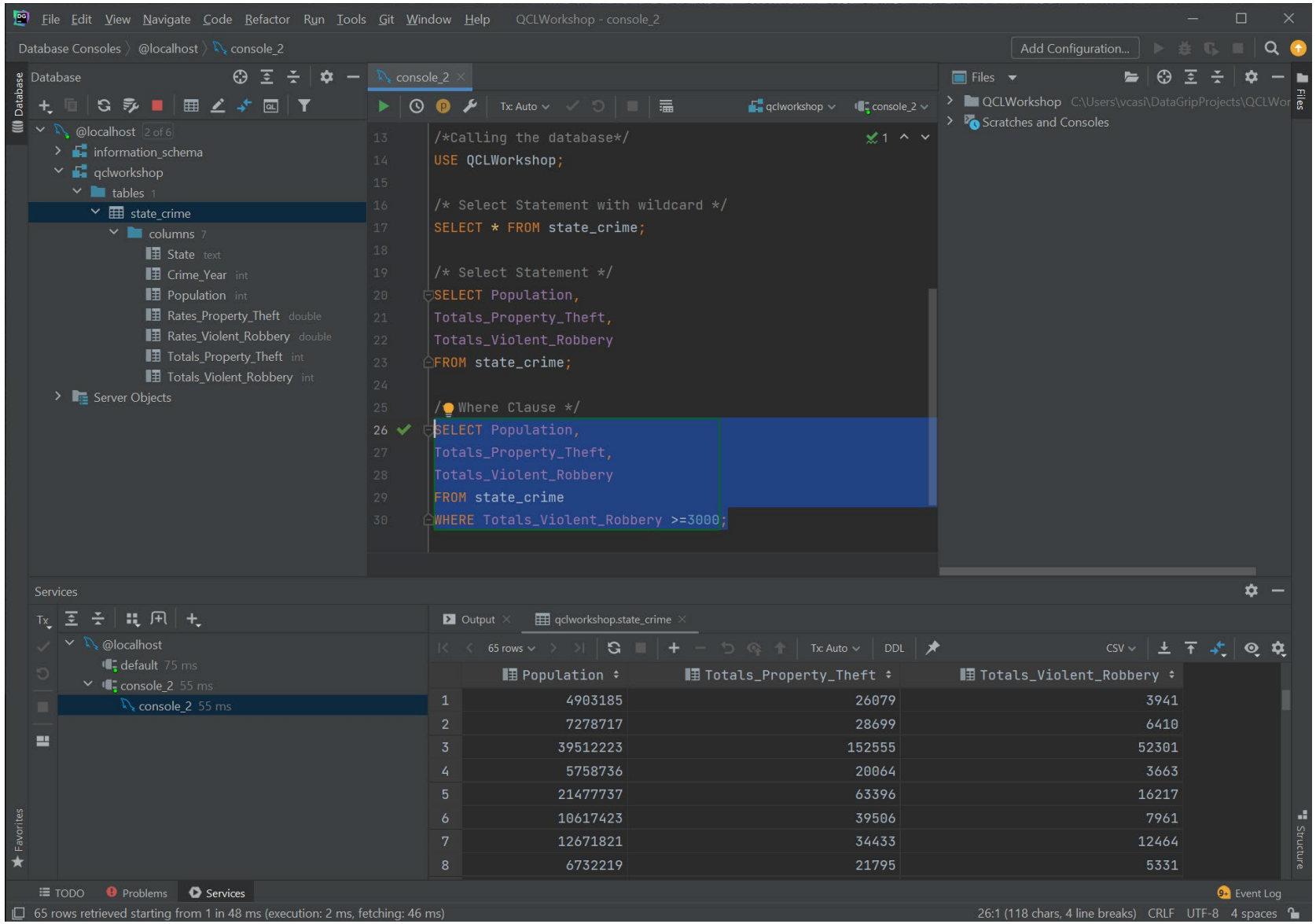
Where Clause

```
/* Where Clause */
SELECT Population,
Totals_Property_Theft,
Totals_Violent_Robbery
FROM state_crime
WHERE Totals_Violent_Robbery >=3000;
```

Detailed view

```
SELECT column1, column2, ...
FROM table_name
WHERE condition;
```



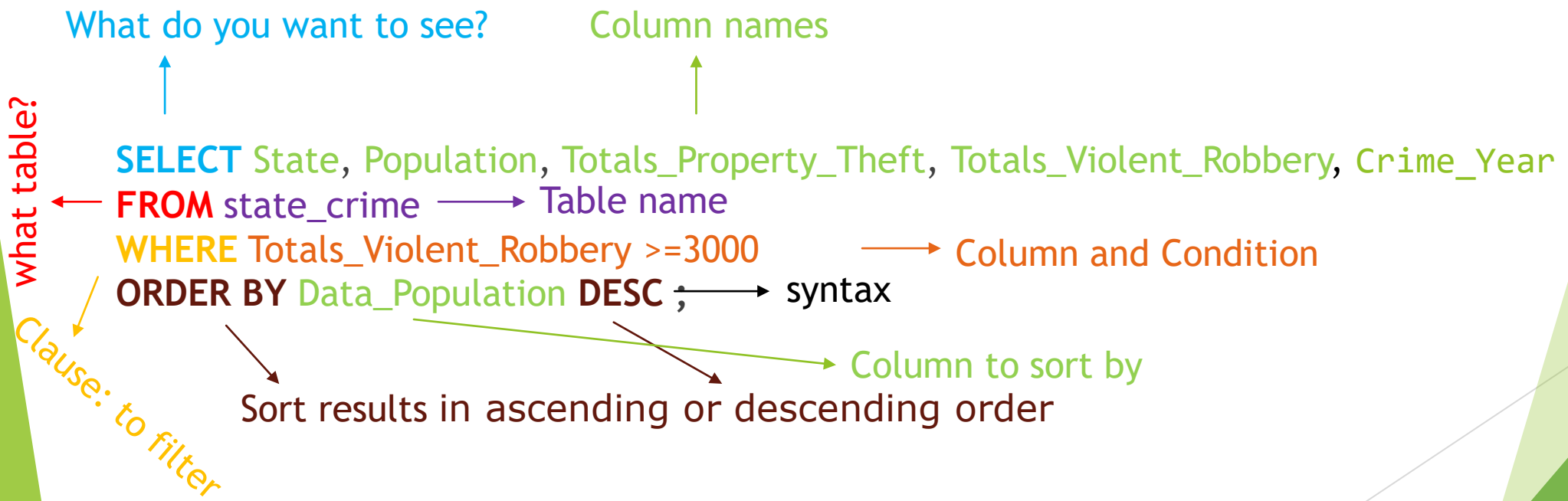

File Edit View Navigate Code Refactor Run Tools Git Window Help
QCLWorkshop - console_2
Database Consoles @localhost console_2
Add Configuration...
Database
@localhost 2 of 6
information_schema
qclworkshop
tables 1
state_crime
columns 7
State text
Crime_Year int
Population int
Rates_Property_Theft double
Rates_Violent_Robbery double
Totals_Property_Theft int
Totals_Violent_Robbery int
Server Objects
console_2
Tx: Auto
qclworkshop
console_2
/*Calling the database*/
USE QCLWorkshop;
/* Select Statement with wildcard */
SELECT * FROM state_crime;
/* Select Statement */
SELECT Population,
Totals_Property_Theft,
Totals_Violent_Robbery
FROM state_crime;
/* Where Clause */
SELECT Population,
Totals_Property_Theft,
Totals_Violent_Robbery
FROM state_crime
WHERE Totals_Violent_Robbery >=3000;
Files
QCLWorkshop C:\Users\vcasi\DataGripProjects\QCLWor
Scratches and Consoles
Services
@localhost
default 75 ms
console_2 55 ms
console_2 55 ms
Output
qclworkshop.state_crime
65 rows
Tx: Auto
DDL
CSV
Population
Totals_Property_Theft
Totals_Violent_Robbery
1 4903185 26079 3941
2 7278717 28699 6410
3 39512223 152555 52301
4 5758736 20064 3663
5 21477737 63396 16217
6 10617423 39506 7961
7 12671821 34433 12464
8 6732219 21795 5331
TODO
Problems
Services
Event Log
65 rows retrieved starting from 1 in 48 ms (execution: 2 ms, fetching: 46 ms)
26:1 (118 chars, 4 line breaks) CRLF UTF-8 4 spaces

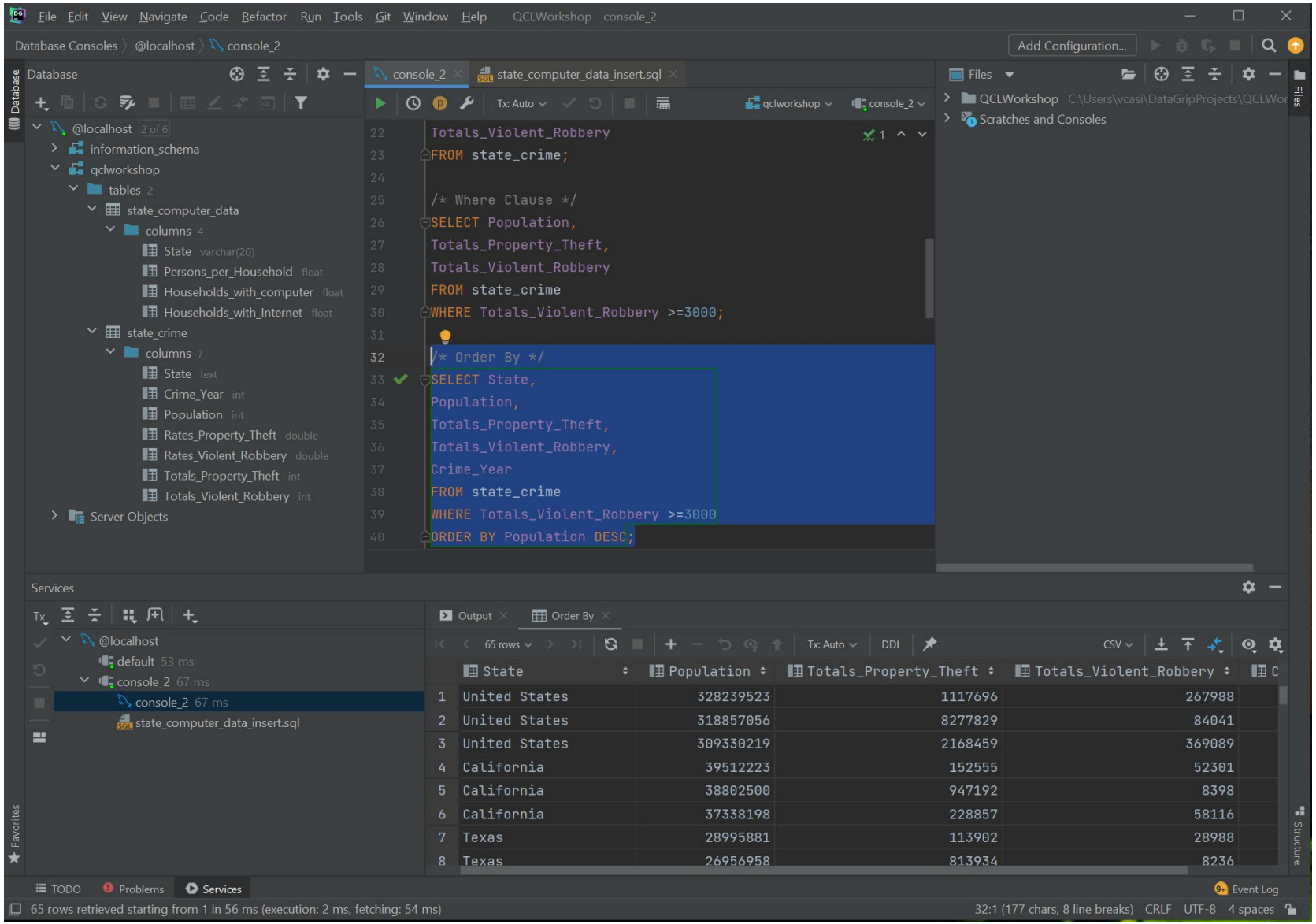
Order by

```
/* Order By */
SELECT State,
Population,
Totals_Property_Theft,
Totals_Violent_Robbery,
Crime_Year
FROM state_crime
WHERE Totals_Violent_Robbery >=3000
ORDER BY Population DESC;
```

Detailed view

```
SELECT column1, column2, ...
FROM table_name
WHERE condition;
ORDER BY column1, column2, ... ASC|DESC;
```




File Edit View Navigate Code Refactor Run Tools Git Window Help QCLWorkshop - console_2
Database Consoles @localhost console_2
Add Configuration...
Database
@localhost 2 of 6
information_schema
qclworkshop
tables 2
state_computer_data
columns 4
State varchar(20)
Persons_per_Household float
Households_with_computer float
Households_with_Internet float
state_crime
columns 7
State text
Crime_Year int
Population int
Rates_Property_Theft double
Rates_Violent_Robbery double
Totals_Property_Theft int
Totals_Violent_Robbery int
Server Objects
console_2
state_computer_data_insert.sql
Tx: Auto
qclworkshop
console_2
Totals_Violent_Robbery
FROM state_crime;
/* Where Clause */
SELECT Population,
Totals_Property_Theft,
Totals_Violent_Robbery
FROM state_crime
WHERE Totals_Violent_Robbery >=3000;
/* Order By */
SELECT State,
Population,
Totals_Property_Theft,
Totals_Violent_Robbery,
Crime_Year
FROM state_crime
WHERE Totals_Violent_Robbery >=3000
ORDER BY Population DESC;
Files
QCLWorkshop C:\Users\vcasi\DataGripProjects\QCLWor
Scratches and Consoles
Services
@localhost
default 53 ms
console_2 67 ms
console_2 67 ms
state_computer_data_insert.sql
Output
Order By
65 rows
Tx: Auto
DDL
CSV
State Population Totals_Property_Theft Totals_Violent_Robbery
1 United States 328239523 1117696 267988
2 United States 318857056 8277829 84041
3 United States 309330219 2168459 369089
4 California 39512223 152555 52301
5 California 38802500 947192 8398
6 California 37338198 228857 58116
7 Texas 28995881 113902 28988
8 Texas 26956958 813934 8236
TODO
Problems
Services
Event Log
65 rows retrieved starting from 1 in 56 ms (execution: 2 ms, fetching: 54 ms)
32:1 (177 chars, 8 line breaks) CRLF UTF-8 4 spaces

Activity #2 – Where Clause and Order by

- Use where clause to find out how many people on average take longer than 20 mins to get to work?
- Use Order by to find out what state has the longest on average time it takes to get to work?

Group By

```
/* Group By */
SELECT State,
Rates_Property_Theft,
Totals_Violent_Robbery,
Population
FROM state_crime
WHERE Totals_Violent_Robbery > 10000
GROUP BY Totals_Violent_Robbery
ORDER BY Totals_Violent_Robbery DESC;
```

Detailed view

```
SELECT column_name(s)
FROM table_name
WHERE condition
GROUP BY column_name(s)
ORDER BY column_name(s);
```

What do you want to see?

Column names

```
SELECT State,
Rates_Property_Theft,
Totals_Violent_Robbery,
Population
FROM state_crime
WHERE Totals_Violent_Robbery>10000
GROUP BY Totals_Violent_Robbery
order by Totals_Violent_Robbery DESC;
```

Clause: to filter what table?

Table name

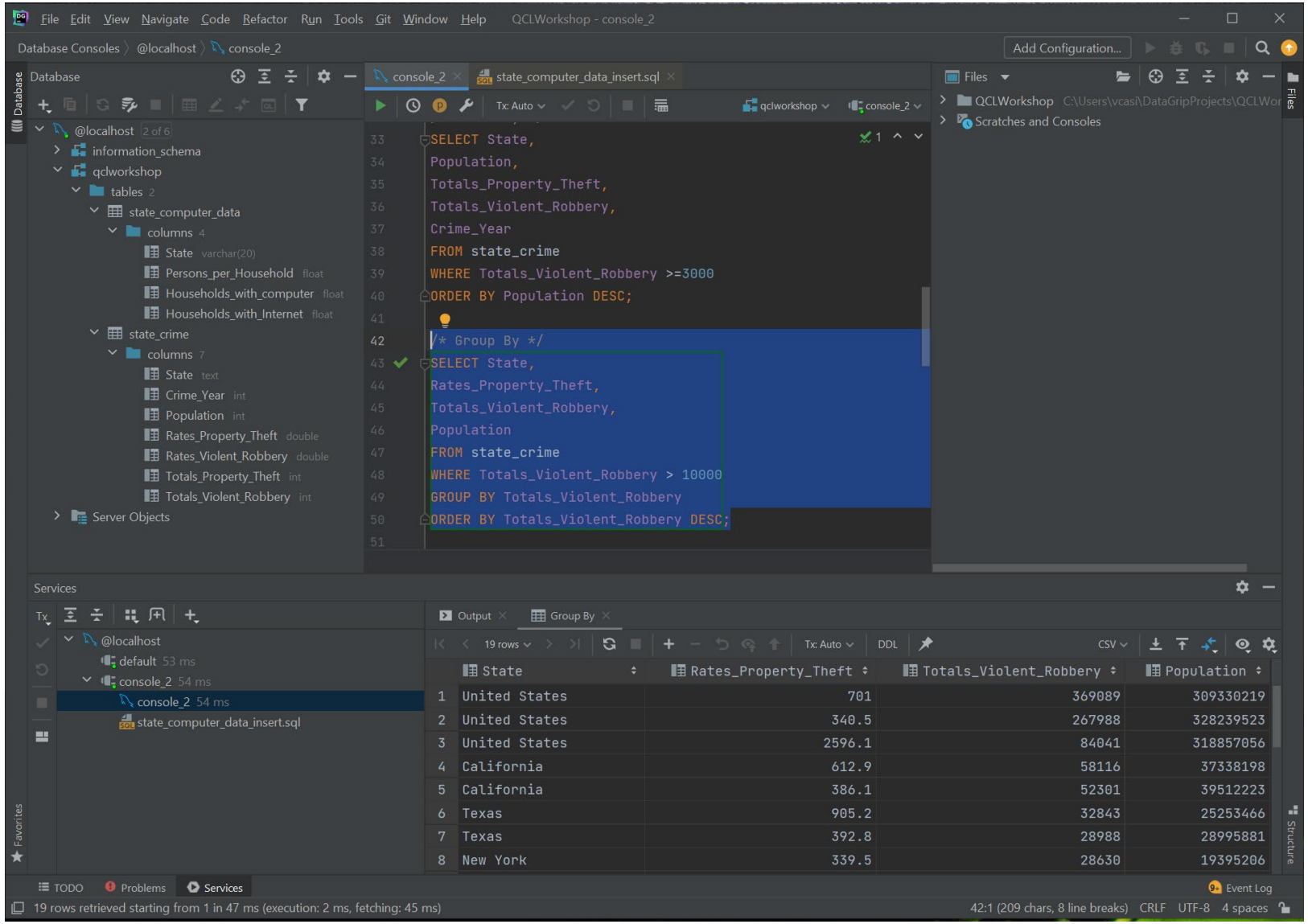
Column and Condition

syntax

Puts rows that are similar together

Sort results in ascending or descending order

Column to sort by


File Edit View Navigate Code Refactor Run Tools Git Window Help
QCLWorkshop - console_2
Database Consoles @localhost console_2
Add Configuration...
Database
@localhost 2 of 6
information_schema
qclworkshop
tables 2
state_computer_data
columns 4
State varchar(20)
Persons_per_Household float
Households_with_computer float
Households_with_Internet float
state_crime
columns 7
State text
Crime_Year int
Population int
Rates_Property_Theft double
Rates_Violent_Robbery double
Totals_Property_Theft int
Totals_Violent_Robbery int
Server Objects
console_2
state_computer_data_insert.sql
Tx: Auto
qclworkshop
console_2
Files
QCLWorkshop C:\Users\vcasi\DataGripProjects\QCLWor
Scratches and Consoles
SELECT State,
Population,
Totals_Property_Theft,
Totals_Violent_Robbery,
Crime_Year
FROM state_crime
WHERE Totals_Violent_Robbery >=3000
ORDER BY Population DESC;
/* Group By */
SELECT State,
Rates_Property_Theft,
Totals_Violent_Robbery,
Population
FROM state_crime
WHERE Totals_Violent_Robbery > 10000
GROUP BY Totals_Violent_Robbery
ORDER BY Totals_Violent_Robbery DESC;
Services
@localhost
default 53 ms
console_2 54 ms
console_2 54 ms
state_computer_data_insert.sql
Output
Group By
19 rows
Tx: Auto
DDL
CSV
State
Rates_Property_Theft
Totals_Violent_Robbery
Population
1 United States 701 369089 309330219
2 United States 340.5 267988 328239523
3 United States 2596.1 84041 318857056
4 California 612.9 58116 37338198
5 California 386.1 52301 39512223
6 Texas 905.2 32843 25253466
7 Texas 392.8 28988 28995881
8 New York 339.5 28630 19395206
TODO
Problems
Services
Event Log
19 rows retrieved starting from 1 in 47 ms (execution: 2 ms, fetching: 45 ms)
42:1 (209 chars, 8 line breaks) CRLF UTF-8 4 spaces

Create Table

```
/* Create Table */
CREATE TABLE state_computer_data(
State VARCHAR (20),
Persons_per_Household FLOAT,
Households_with_computer FLOAT,
Households_with_Internet FLOAT
);
```

Detailed view

```
CREATE TABLE table_name (
    column1 datatype,
    column2 datatype,
    column3 datatype,
   ....
);
```

create new table

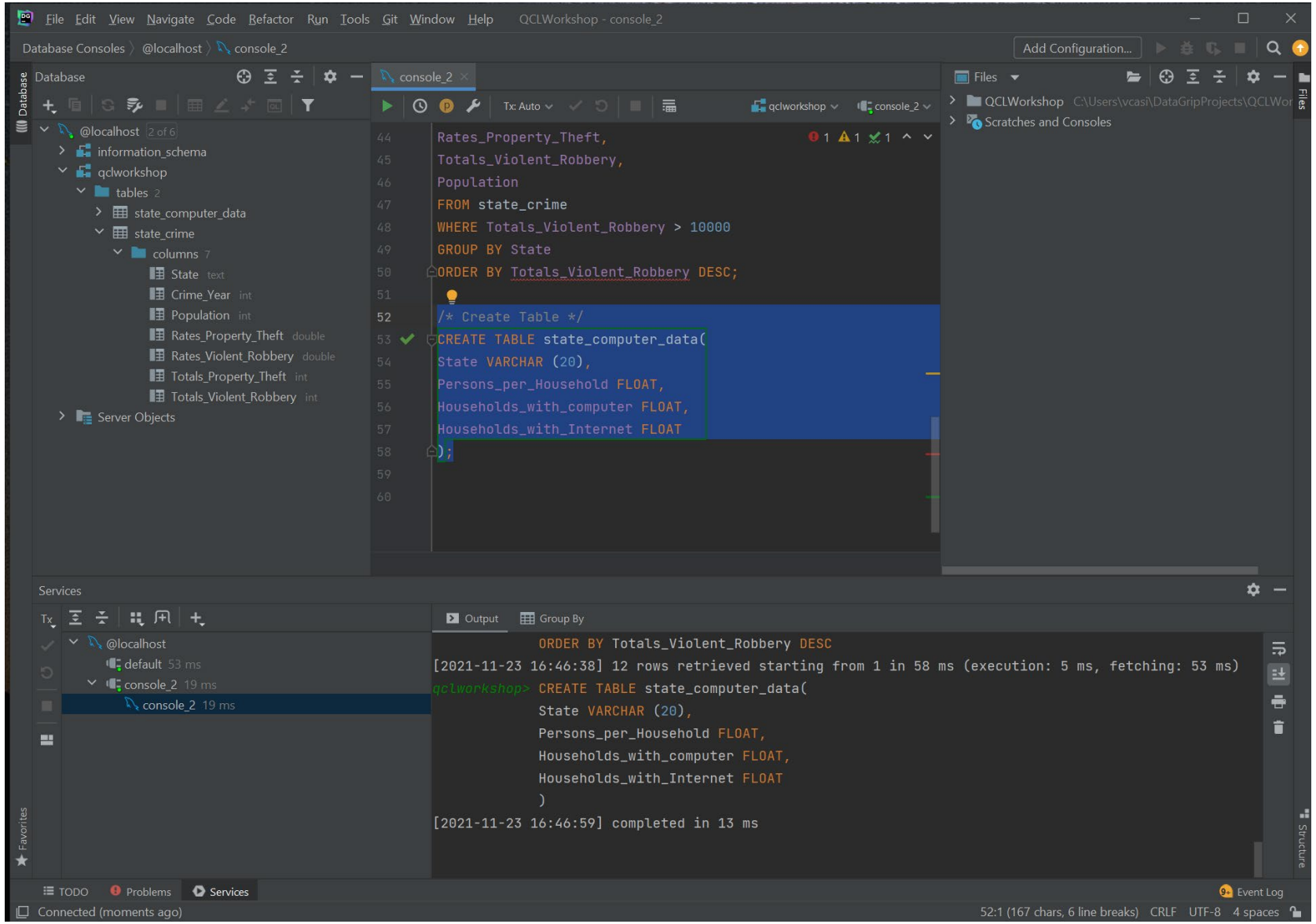
Name to give table

Columns

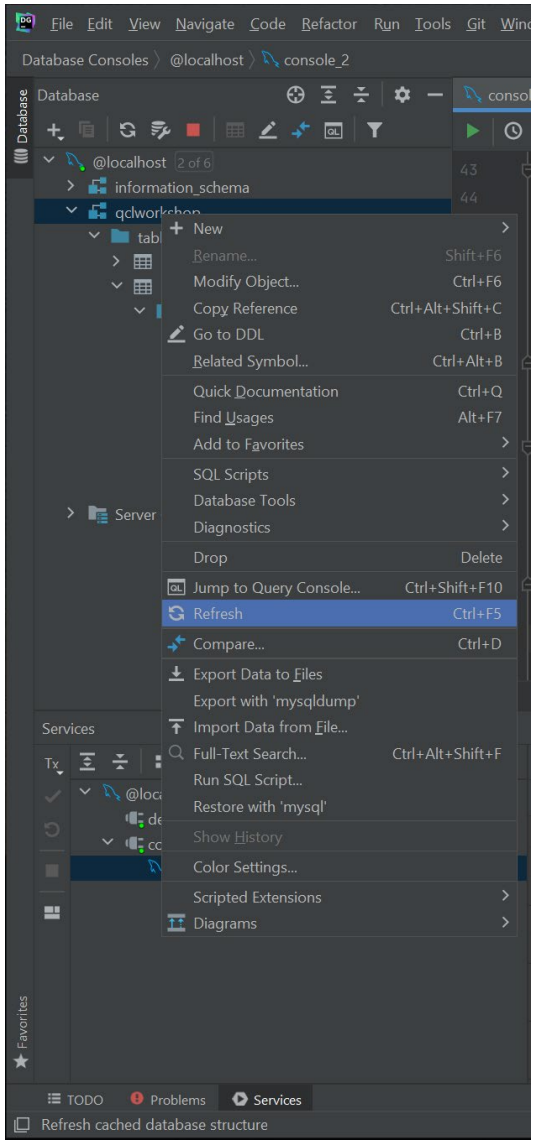
```
create table state_computer_data (
State varchar (20),
Persons_per_Household float,
Households_with_a_computer float,
Households_with_a_Internet float
);
```

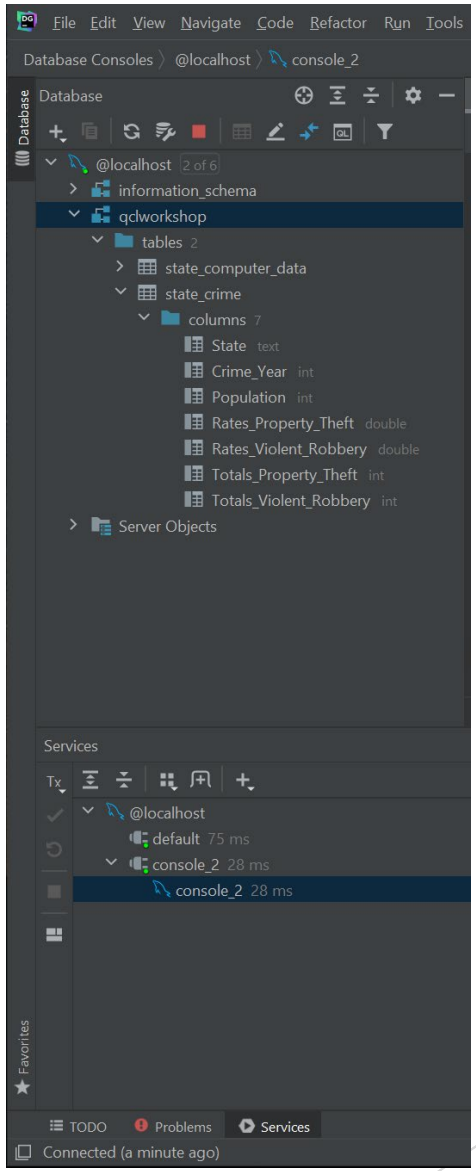
Datatype

syntax


File Edit View Navigate Code Refactor Run Tools Git Window Help
QCLWorkshop - console_2
Database Consoles @localhost console_2
Add Configuration...
Database
@localhost 2 of 6
information_schema
qclworkshop
tables 2
state_computer_data
state_crime
columns 7
State text
Crime_Year int
Population int
Rates_Property_Theft double
Rates_Violent_Robbery double
Totals_Property_Theft int
Totals_Violent_Robbery int
Server Objects
console_2
Tx: Auto
qclworkshop
console_2
Rates_Property_Theft,
Totals_Violent_Robbery,
Population
FROM state_crime
WHERE Totals_Violent_Robbery > 10000
GROUP BY State
ORDER BY Totals_Violent_Robbery DESC;
/* Create Table */
CREATE TABLE state_computer_data(
State VARCHAR (20),
Persons_per_Household FLOAT,
Households_with_computer FLOAT,
Households_with_Internet FLOAT
);
Files
QCLWorkshop C:\Users\vcasi\DataGripProjects\QCLWor
Scratches and Consoles
Services
@localhost
default 53 ms
console_2 19 ms
console_2 19 ms
Output
Group By
ORDER BY Totals_Violent_Robbery DESC
[2021-11-23 16:46:38] 12 rows retrieved starting from 1 in 58 ms (execution: 5 ms, fetching: 53 ms)
qclworkshop> CREATE TABLE state_computer_data(
State VARCHAR (20),
Persons_per_Household FLOAT,
Households_with_computer FLOAT,
Households_with_Internet FLOAT
)
[2021-11-23 16:46:59] completed in 13 ms
TODO
Problems
Services
Event Log
Connected (moments ago)
52:1 (167 chars, 6 line breaks) CRLF UTF-8 4 spaces

Refresh


File Edit View Navigate Code Refactor Run Tools Git
Database Consoles @localhost console_2
Database
@localhost 2 of 6
information_schema
qclworkshop
New
Rename... Shift+F6
Modify Object... Ctrl+F6
Copy Reference Ctrl+Alt+Shift+C
Go to DDL Ctrl+B
Related Symbol... Ctrl+Alt+B
Quick Documentation Ctrl+Q
Find Usages Alt+F7
Add to Favorites
SQL Scripts
Database Tools
Diagnostics
Drop Delete
Jump to Query Console... Ctrl+Shift+F10
Refresh Ctrl+F5
Compare... Ctrl+D
Export Data to Files
Export with 'mysqldump'
Import Data from File...
Full-Text Search... Ctrl+Alt+Shift+F
Run SQL Script...
Restore with 'mysql'
Show History
Color Settings...
Scripted Extensions
Diagrams
Server
Services
TODO Problems Services
Refresh cached database structure


File Edit View Navigate Code Refactor Run Tools
Database Consoles @localhost console_2
Database
@localhost 2 of 6
information_schema
qclworkshop
tables 2
state_computer_data
state_crime
columns 7
State text
Crime_Year int
Population int
Rates_Property_Theft double
Rates_Violent_Robbery double
Totals_Property_Theft int
Totals_Violent_Robbery int
Server Objects
Services
@localhost
default 75 ms
console_2 28 ms
console_2 28 ms
TODO Problems Services
Connected (a minute ago)

Insert and Detail View

```
INSERT INTO table_name (column1, column2, column3, ...)
VALUES (value1, value2, value3, ...);
```

```
/* Insert into */
INSERT INTO state_computer_data
VALUES('Alabama', 2.55, 85.5, 76.4);
```

Put data into table

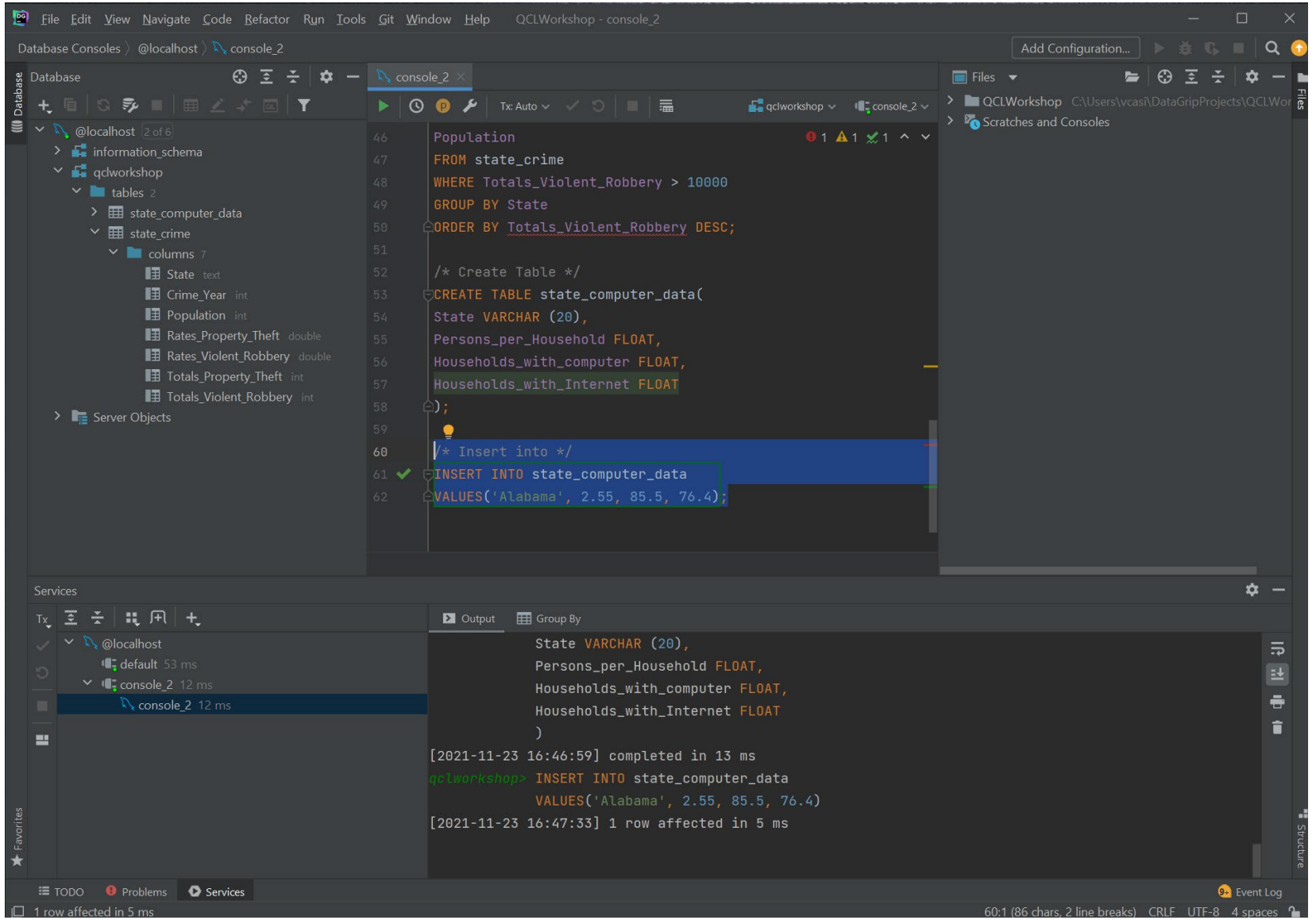
Table

```
insert into state_computer_data
values('Alabama', 2.55, 85.5, 76.4);
```

→ syntax

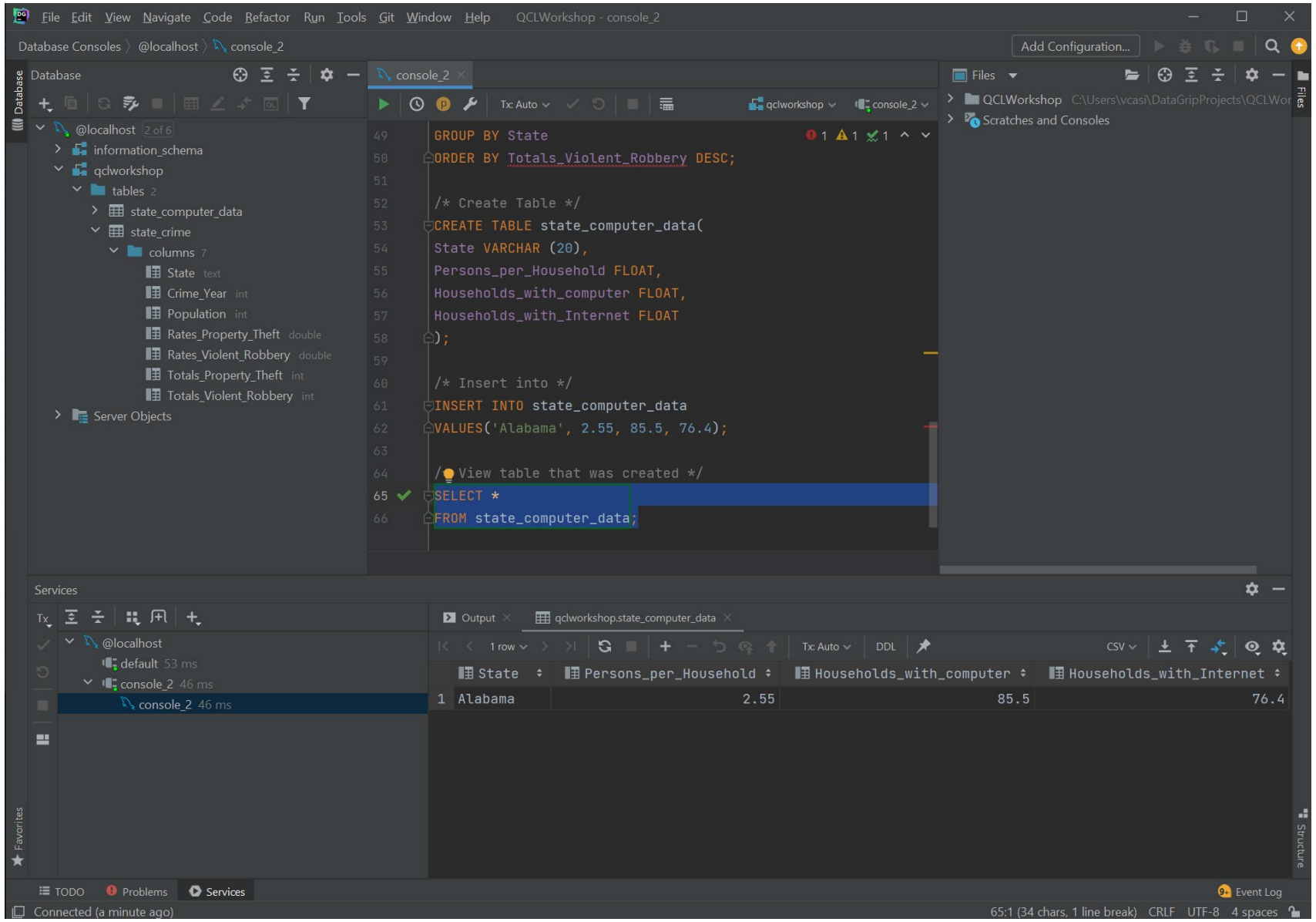
Tell program to input this information

Data that you are inputting

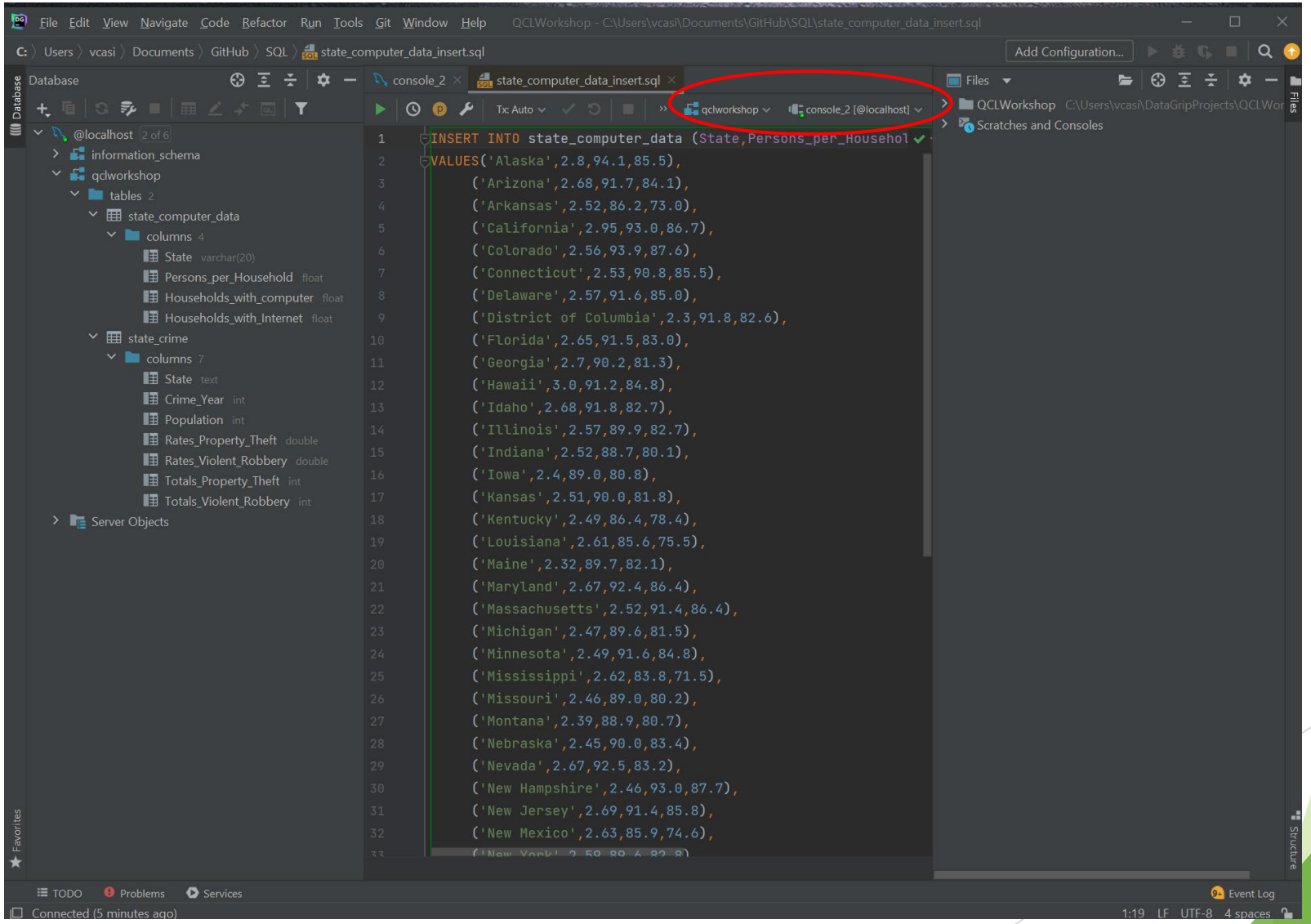

File Edit View Navigate Code Refactor Run Tools Git Window Help
QCLWorkshop - console_2
Database Consoles @localhost console_2
Add Configuration...
Database
@localhost 2 of 6
information_schema
qclworkshop
tables 2
state_computer_data
state_crime
columns 7
State text
Crime_Year int
Population int
Rates_Property_Theft double
Rates_Violent_Robbery double
Totals_Property_Theft int
Totals_Violent_Robbery int
Server Objects
console_2
Tx: Auto
qclworkshop
console_2
Population
FROM state_crime
WHERE Totals_Violent_Robbery > 10000
GROUP BY State
ORDER BY Totals_Violent_Robbery DESC;
/* Create Table */
CREATE TABLE state_computer_data(
State VARCHAR (20),
Persons_per_Household FLOAT,
Households_with_computer FLOAT,
Households_with_Internet FLOAT
);
/* Insert into */
INSERT INTO state_computer_data
VALUES('Alabama', 2.55, 85.5, 76.4);
Files
QCLWorkshop C:\Users\vcasi\DataGripProjects\QCLWor
Scratches and Consoles
Services
@localhost
default 53 ms
console_2 12 ms
console_2 12 ms
Output
Group By
State VARCHAR (20),
Persons_per_Household FLOAT,
Households_with_computer FLOAT,
Households_with_Internet FLOAT
)
[2021-11-23 16:46:59] completed in 13 ms
qclworkshop> INSERT INTO state_computer_data
VALUES('Alabama', 2.55, 85.5, 76.4)
[2021-11-23 16:47:33] 1 row affected in 5 ms
TODO
Problems
Services
Event Log
1 row affected in 5 ms
60:1 (86 chars, 2 line breaks) CRLF UTF-8 4 spaces

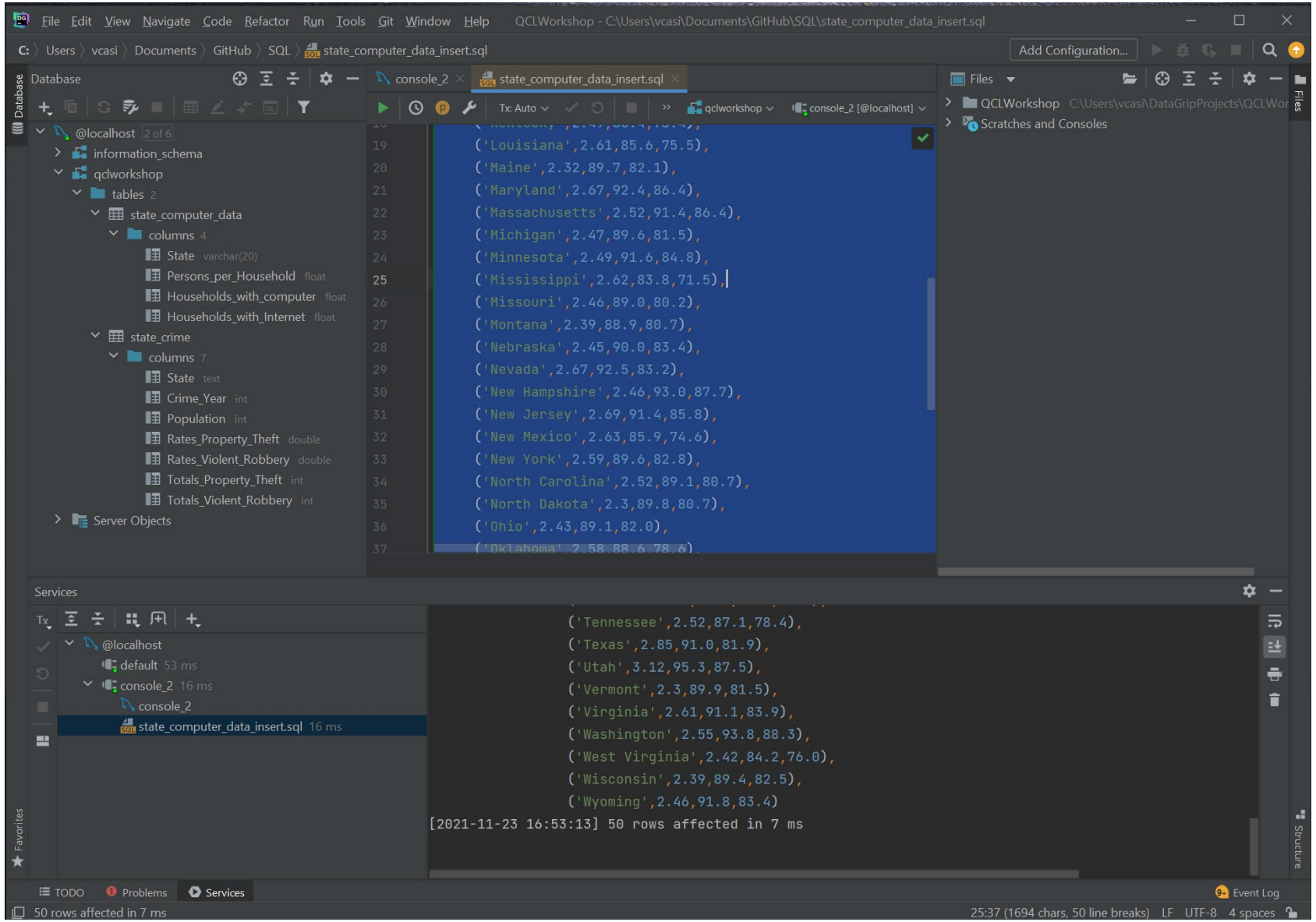
Look at table with one column

```
/* View table that was created */
SELECT *
FROM state_computer_data;
```


File Edit View Navigate Code Refactor Run Tools Git Window Help
QCLWorkshop - console_2
Database Consoles @localhost console_2
Add Configuration...
Database
@localhost 2 of 6
information_schema
qclworkshop
tables 2
state_computer_data
state_crime
columns 7
State text
Crime_Year int
Population int
Rates_Property_Theft double
Rates_Violent_Robbery double
Totals_Property_Theft int
Totals_Violent_Robbery int
Server Objects
console_2
Tx: Auto
qclworkshop
console_2
GROUP BY State
ORDER BY Totals_Violent_Robbery DESC;
/* Create Table */
CREATE TABLE state_computer_data(
State VARCHAR (20),
Persons_per_Household FLOAT,
Households_with_computer FLOAT,
Households_with_Internet FLOAT
);
/* Insert into */
INSERT INTO state_computer_data
VALUES('Alabama', 2.55, 85.5, 76.4);
/* View table that was created */
SELECT *
FROM state_computer_data;
Files
QCLWorkshop C:\Users\vcasi\DataGripProjects\QCLWor
Scratches and Consoles
Services
@localhost
default 53 ms
console_2 46 ms
console_2 46 ms
Output
qclworkshop.state_computer_data
1 row
Tx: Auto
DDL
CSV
State
Persons_per_Household
Households_with_computer
Households_with_Internet
1 Alabama 2.55 85.5 76.4
TODO
Problems
Services
Event Log
Connected (a minute ago)
65:1 (34 chars, 1 line break) CRLF UTF-8 4 spaces

Insert data (alternative)



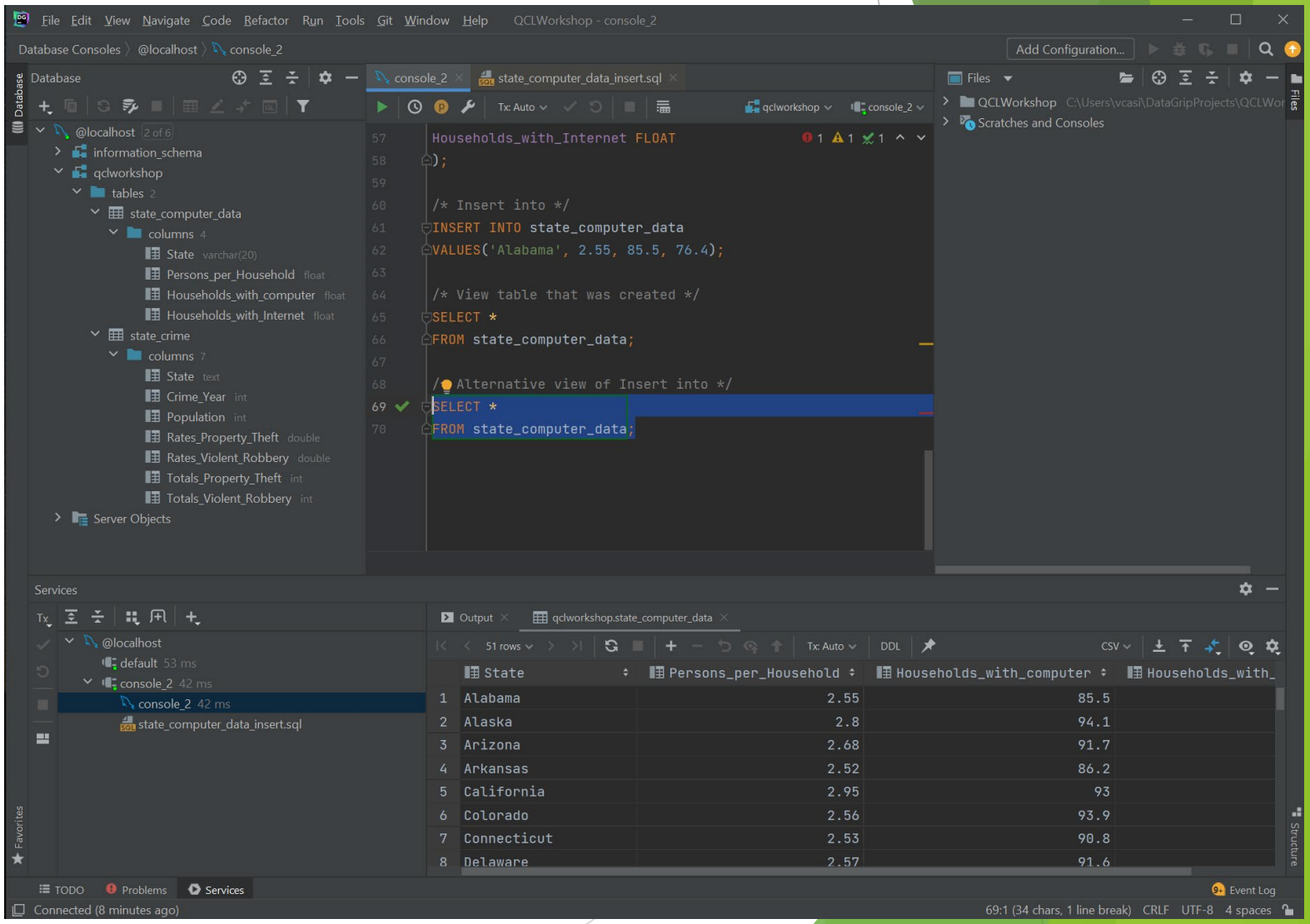

File Edit View Navigate Code Refactor Run Tools Git Window Help
QCLWorkshop - C:\Users\vcasi\Documents\GitHub\SQL\state_computer_data_insert.sql
Add Configuration...
Database
@localhost 2 of 6
information_schema
qclworkshop
tables 2
state_computer_data
columns 4
State varchar(20)
Persons_per_Household float
Households_with_computer float
Households_with_Internet float
state_crime
columns 7
State text
Crime_Year int
Population int
Rates_Property_Theft double
Rates_Violent_Robbery double
Totals_Property_Theft int
Totals_Violent_Robbery int
Server Objects
console_2
state_computer_data_insert.sql
Tx: Auto
qclworkshop
console_2 [@localhost]
('Louisiana',2.61,85.6,75.5),
('Maine',2.32,89.7,82.1),
('Maryland',2.67,92.4,86.4),
('Massachusetts',2.52,91.4,86.4),
('Michigan',2.47,89.6,81.5),
('Minnesota',2.49,91.6,84.8),
('Mississippi',2.62,83.8,71.5),
('Missouri',2.46,89.0,80.2),
('Montana',2.39,88.9,80.7),
('Nebraska',2.45,90.0,83.4),
('Nevada',2.67,92.5,83.2),
('New Hampshire',2.46,93.0,87.7),
('New Jersey',2.69,91.4,85.8),
('New Mexico',2.63,85.9,74.6),
('New York',2.59,89.6,82.8),
('North Carolina',2.52,89.1,80.7),
('North Dakota',2.3,89.8,80.7),
('Ohio',2.43,89.1,82.0),
('Oklahoma',2.58,88.6,78.6)
Files
QCLWorkshop C:\Users\vcasi\DataGripProjects\QCLWor
Scratches and Consoles
Services
@localhost
default 53 ms
console_2 16 ms
console_2
state_computer_data_insert.sql 16 ms
('Tennessee',2.52,87.1,78.4),
('Texas',2.85,91.0,81.9),
('Utah',3.12,95.3,87.5),
('Vermont',2.3,89.9,81.5),
('Virginia',2.61,91.1,83.9),
('Washington',2.55,93.8,88.3),
('West Virginia',2.42,84.2,76.0),
('Wisconsin',2.39,89.4,82.5),
('Wyoming',2.46,91.8,83.4)
[2021-11-23 16:53:13] 50 rows affected in 7 ms
TODO
Problems
Services
Event Log
50 rows affected in 7 ms
25:37 (1694 chars, 50 line breaks) LF UTF-8 4 spaces
Favorites
Structure

Insert data (cont.)

Look at table data

Which column looks like a column that has the same information for both tables?

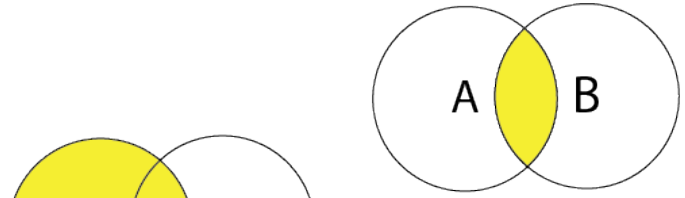
```
/* View table that was created */
SELECT *
FROM state_computer_data;
```



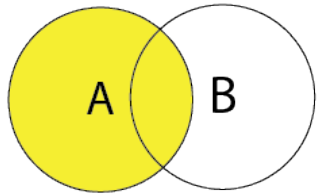
Activity #3 – Create Table and Insert Data

- Create a table named state_people and add the attributes:
  State as a varchar with 20 characters,
  Employment_Firms_Total as a integer,
  Age_Percent_Under_18_Years as a float,
  and Age_Percent_65_and_Older as a float.

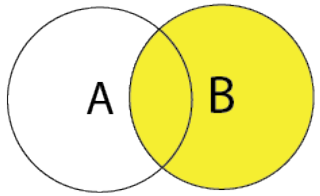
- Insert data into your new table called state_people using a sql file in the downloaded github folder



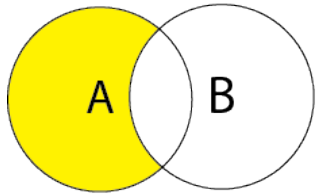
Inner Join



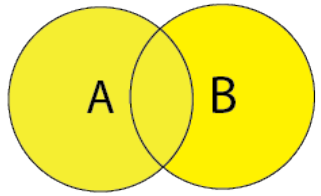
Left Join



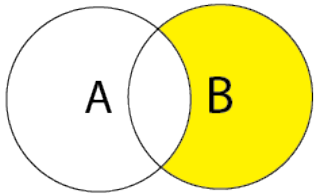
Right Join



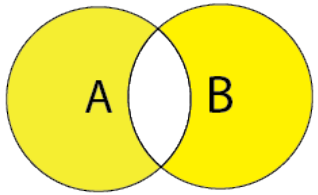
Left Join Excluding
Inner Join



Full Outer Join

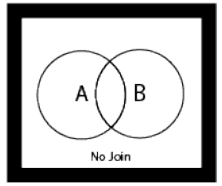


Right Join Excluding
Inner Join



Full Outer Join Excluding
Inner Join

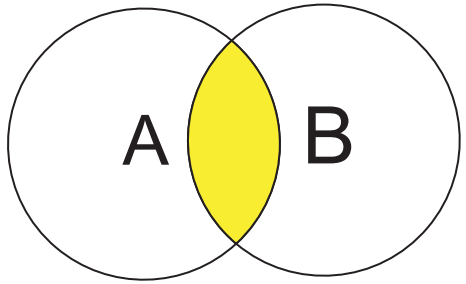
SQL JOINS



Made in Adobe Illustrator

Vanessa Casillas (Graduate Fellow at QCL)

Inner Join

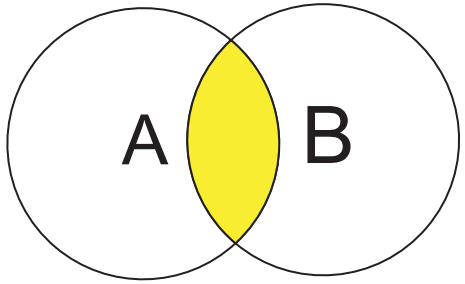


Inner Join

```
/* Inner Join */
SELECT state_computer_data.State,
state_computer_data.Households_with_computer,
state_crime.Totals_Property_Theft
FROM state_computer_data
JOIN state_crime
ON state_computer_data.state = state_crime.State;
```

Detail View

```
SELECT column_name(s)
FROM table1
INNER JOIN table2
ON table1.column_name = table2.column_name;
```



Inner Join

What do you want to see?

Table name

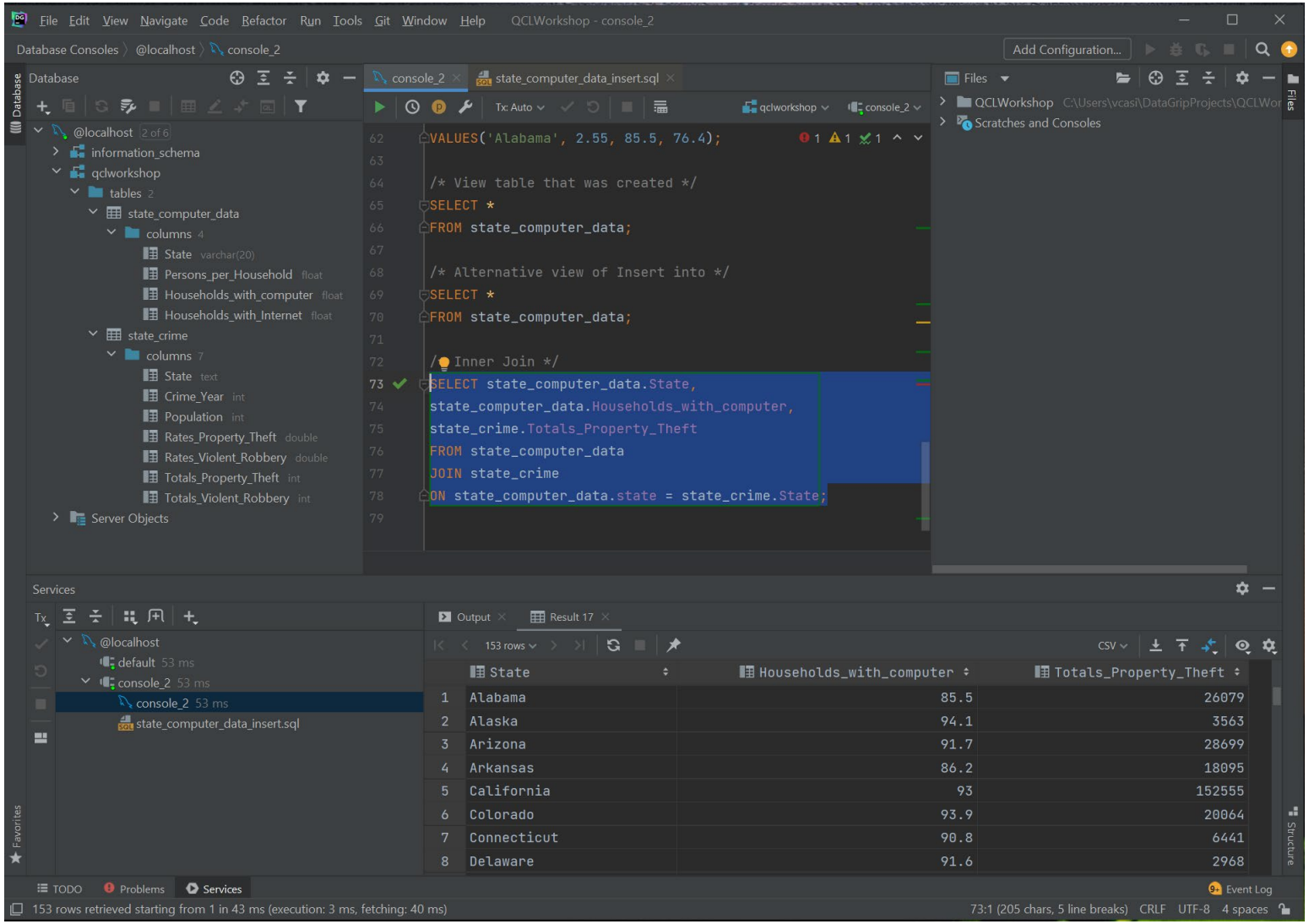
Column names

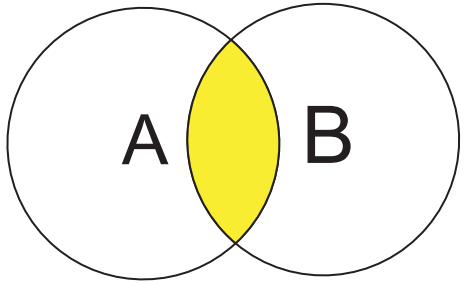
what table?

```
SELECT state_computer_data.State,
state_computer_data.Households_with_a_computer,
state_crime.Totals_Property_Theft
FROM state_computer_data
JOIN state_crime
ON state_computer_data.state = state_crime.State;
```

→ syntax

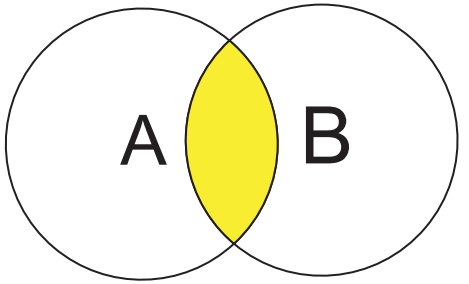
What table are you joining and on what columns?
You can just join if you are making an inner join, yet if you are making any other join, you do have to specify


File Edit View Navigate Code Refactor Run Tools Git Window Help
QCLWorkshop - console_2
Database Consoles @localhost console_2
Add Configuration...
Database
@localhost 2 of 6
information_schema
qclworkshop
tables 2
state_computer_data
columns 4
State varchar(20)
Persons_per_Household float
Households_with_computer float
Households_with_Internet float
state_crime
columns 7
State text
Crime_Year int
Population int
Rates_Property_Theft double
Rates_Violent_Robbery double
Totals_Property_Theft int
Totals_Violent_Robbery int
Server Objects
console_2
state_computer_data_insert.sql
Tx: Auto
qclworkshop
console_2
Files
QCLWorkshop C:\Users\vcasi\DataGripProjects\QCLWor
Scratches and Consoles
62 VALUES('Alabama', 2.55, 85.5, 76.4);
63
64 /* View table that was created */
65 SELECT *
66 FROM state_computer_data;
67
68 /* Alternative view of Insert into */
69 SELECT *
70 FROM state_computer_data;
71
72 /* Inner Join */
73 SELECT state_computer_data.State,
74 state_computer_data.Households_with_computer,
75 state_crime.Totals_Property_Theft
76 FROM state_computer_data
77 JOIN state_crime
78 ON state_computer_data.state = state_crime.State;
79
Services
@localhost
default 53 ms
console_2 53 ms
console_2 53 ms
state_computer_data_insert.sql
Output
Result 17
153 rows
CSV
State
Households_with_computer
Totals_Property_Theft
1 Alabama 85.5 26079
2 Alaska 94.1 3563
3 Arizona 91.7 28699
4 Arkansas 86.2 18095
5 California 93 152555
6 Colorado 93.9 20064
7 Connecticut 90.8 6441
8 Delaware 91.6 2968
TODO
Problems
Services
Event Log
153 rows retrieved starting from 1 in 43 ms (execution: 3 ms, fetching: 40 ms)
73:1 (205 chars, 5 line breaks) CRLF UTF-8 4 spaces


A
B

Inner Join

Alias

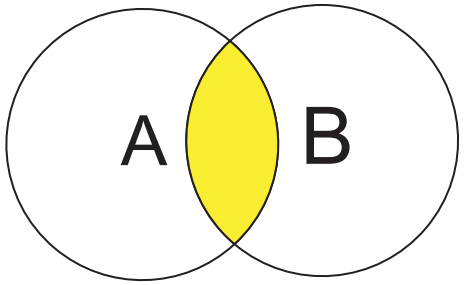


Inner Join

```
/* Alias */
SELECT a.State,
a.Households_with_computer,
b.Totals_Property_Theft,
b.Totals_Violent_Robbery
FROM state_computer_data AS a
JOIN state_crime AS b
ON a.state = b.State;
```

Detail View

```
SELECT column_name(s)
FROM table_name AS alias_name;
```



Inner Join

What do you want to see?

Table name

Column names

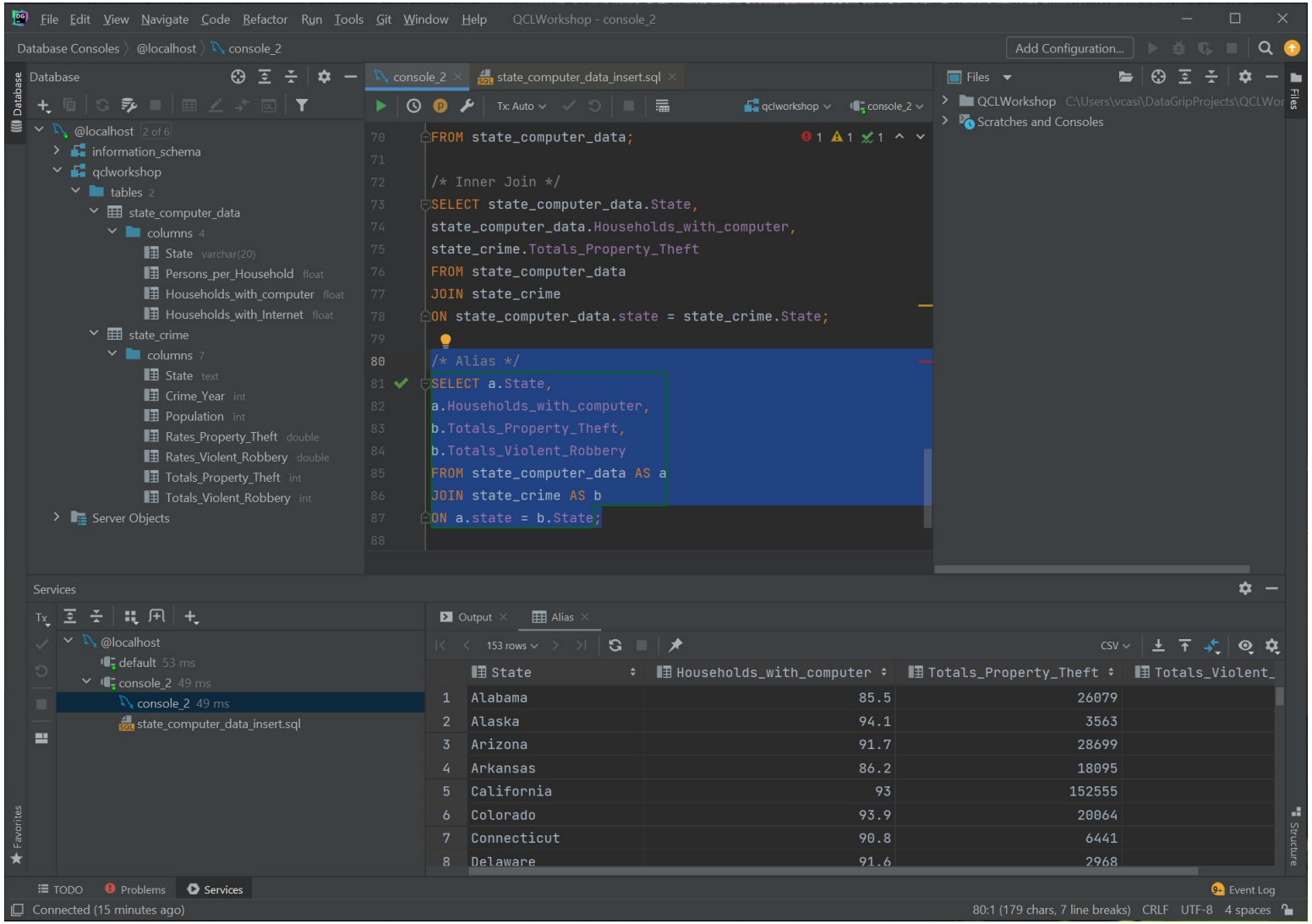
```
SELECT a.State,
a.Households_with_a_computer,
b.Totals_Property_Theft,
b.Totals_Violent_Robbery
FROM state_computer_data AS a
JOIN state_crime AS b
ON a.state = b.State;
```

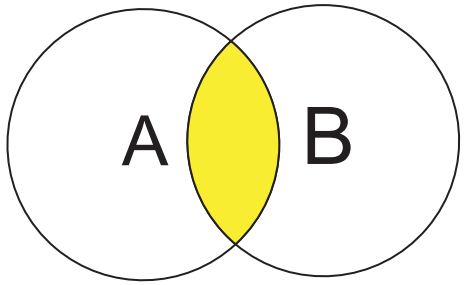
what table?

Give the table an alias name must put "as" to assign it

syntax

What table are you joining and on what columns?
You can just join if you are making an inner join, yet if you are making any other join, you do have to specify


File Edit View Navigate Code Refactor Run Tools Git Window Help
QCLWorkshop - console_2
Database Consoles @localhost console_2
Add Configuration...
Database
console_2
state_computer_data_insert.sql
Files
QCLWorkshop C:\Users\vcasi\DataGripProjects\QCLWor
Scratches and Consoles
@localhost 2 of 6
information_schema
qclworkshop
tables 2
state_computer_data
columns 4
State varchar(20)
Persons_per_Household float
Households_with_computer float
Households_with_Internet float
state_crime
columns 7
State text
Crime_Year int
Population int
Rates_Property_Theft double
Rates_Violent_Robbery double
Totals_Property_Theft int
Totals_Violent_Robbery int
Server Objects
FROM state_computer_data;
/* Inner Join */
SELECT state_computer_data.State,
state_computer_data.Households_with_computer,
state_crime.Totals_Property_Theft
FROM state_computer_data
JOIN state_crime
ON state_computer_data.state = state_crime.State;
/* Alias */
SELECT a.State,
a.Households_with_computer,
b.Totals_Property_Theft,
b.Totals_Violent_Robbery
FROM state_computer_data AS a
JOIN state_crime AS b
ON a.state = b.State;
Services
Output
Alias
153 rows
CSV
@localhost
default 53 ms
console_2 49 ms
console_2 49 ms
state_computer_data_insert.sql
State
Households_with_computer
Totals_Property_Theft
Totals_Violent_
1 Alabama 85.5 26079
2 Alaska 94.1 3563
3 Arizona 91.7 28699
4 Arkansas 86.2 18095
5 California 93 152555
6 Colorado 93.9 20064
7 Connecticut 90.8 6441
8 Delaware 91.6 2968
TODO
Problems
Services
Event Log
Connected (15 minutes ago)
80:1 (179 chars, 7 line breaks) CRLF UTF-8 4 spaces


A
B

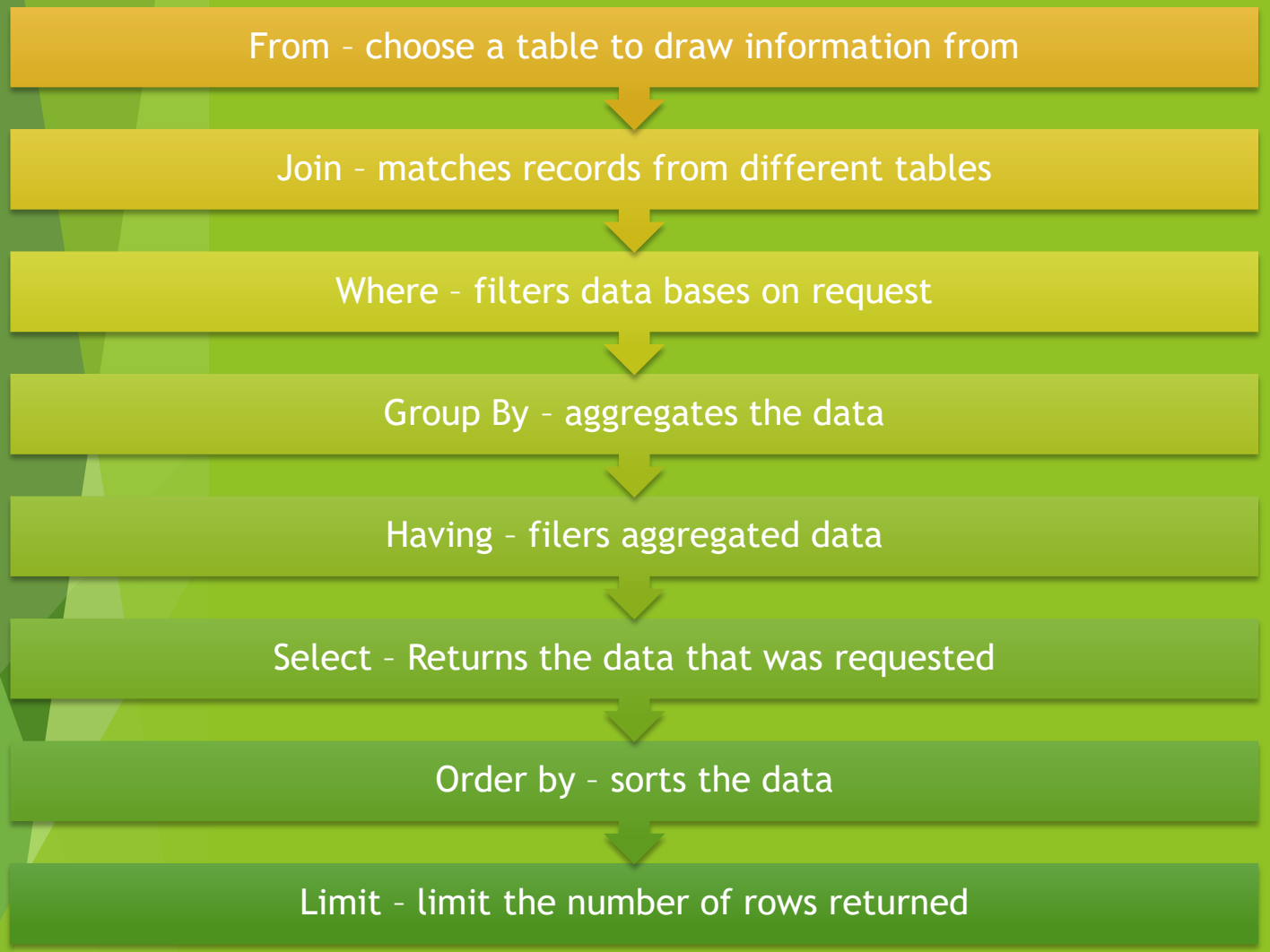
Inner Join

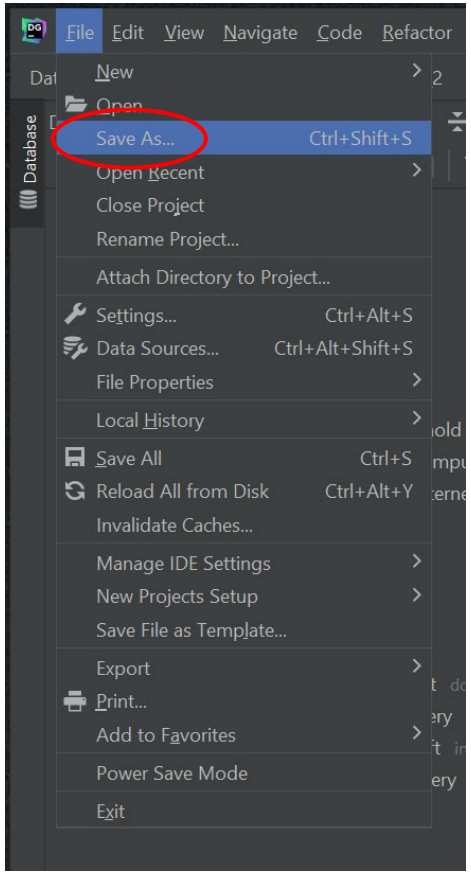
Activity #4 – Inner Join with Alias

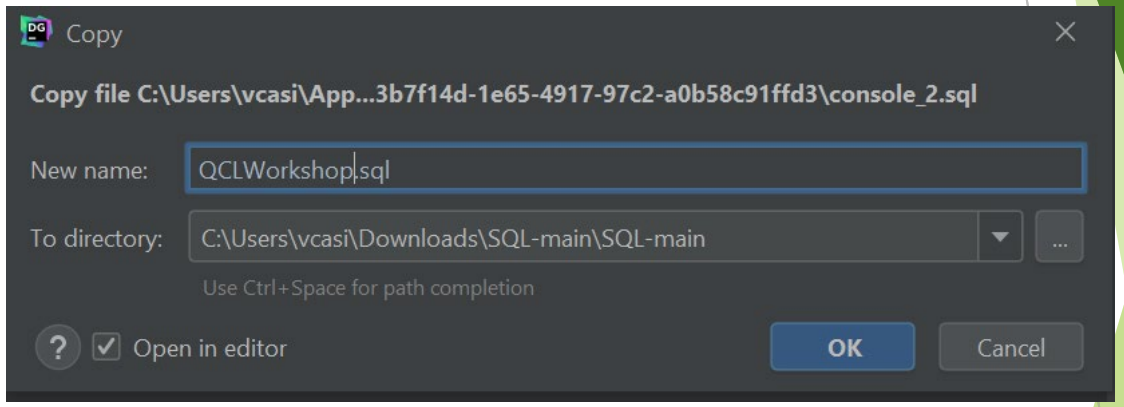
- Create an inner join using aliases with tables state_workforce and state_people, make sure to view attributes: state, Mean_Travel_Time_to_Work, and Employment_Firms_Total

Writing Query

Operation Order




File
Edit
View
Navigate
Code
Refactor
New
Open...
Save As... Ctrl+Shift+S
Open Recent
Close Project
Rename Project...
Attach Directory to Project...
Settings... Ctrl+Alt+S
Data Sources... Ctrl+Alt+Shift+S
File Properties
Local History
Save All Ctrl+S
Reload All from Disk Ctrl+Alt+Y
Invalidate Caches...
Manage IDE Settings
New Projects Setup
Save File as Template...
Export
Print...
Add to Favorites
Power Save Mode
Exit
Database


Copy
Copy file C:\Users\vcasi\App...3b7f14d-1e65-4917-97c2-a0b58c91ffd3\console_2.sql
New name:
QCLWorkshop.sql
To directory:
C:\Users\vcasi\Downloads\SQL-main\SQL-main
Use Ctrl+Space for path completion
Open in editor
OK
Cancel

Save

Resources

- Dbeaver Wiki - https://github.com/dbeaver/dbeaver/wiki
- W3schools - https://www.w3schools.com/sql/default.asp
- Code Academy- https://www.w3schools.com/sql/default.asp
- Quizlet - https://quizlet.com/ (for vocab testing)

Best way to learn

- SQL Murder Mystery - https://mystery.knightlab.com/

Contact info

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- Vanessa Casillas: vanessa.casillas@claremontmckenna.edu